THE FARMERS' REGISTER.

VOL. II. APRIL, 1835. No. 11.

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CHICKAHOMONY SWAMP LANDS—BLUE GRASS AND HERDS GRASS MEADOWS—GRASS HUSBANDRY.

To the Editor of the Farmers' Register.

Henrico, February, 1835.

All the streams in this whole region of the state, large enough to turn a grist mill, are bordered by low grounds or alluvial flats; varying in width, nearly in proportion to their length. There is much difference also, in their soil, for that partakes much of the color and character of the lands through which the upper parts of the streams and their tributaries pass. The Chickahomony, for instance, rises in the "livery," slashy lands of Hanover and Henrico; and its low grounds are generally stiff, with a considerable portion of white and party colored clay. Above the New Kent line they are comparatively narrow, and more diversified in appearance—subject to inundation, and producing a remarkably thick and tall growth of gum, ash, maple, elm, white-oak, willow oak, and many other trees of the climate. The growth depends, however, very much on the liability of the spot to water. A large proportion, (and that much the most valuable,) of these bottoms are yet to clear; and will probably remain a long time unreclaimed, as they are subject to be often under water; and when the water is off, remain too wet for almost any agricultural purpose, until the heat of the summer has evaporated the moisture. The river is narrow, very devious in its course; with low banks. Indeed it is evident, that it has frequently changed its bed. Some years ago a law was passed, granting a lottery to raise the means of straightening and clearing out this river; but owing to some defects in its details, or some other cause, the act remains, like many others, a dead letter on the statute book. Individuals have deepened and widened the old bed, for some miles, with evident benefit. The water does not overflow to the same extent, nor remain so long as formerly; and the bed is washing deeper annually, and injuriously, for the present, to the lands below, where this operation has not been performed.

There seems to be fall enough, quite to the head of tide-water, to take off the freshets, if a vent sufficient in width and depth, were made. If the land owners were to unite with proper harmony and determination, this object might be easily effected, and its benefits would compensate the expense, more than an hundred-fold. Sixty thousand acres of land at the least calculation, would be rapidly thrown into the most profitable tillage. This could not fail to be the result, as the soil is exceedingly fertile, producing enormous crops of hay, and within a few miles of Richmond. Almost an incredible number of the trunks and branches of huge trees, the growth of past ages, lie to and fro, either entirely rotten, or fast decaying in the water and mud; giving out with the annual contributions of vegetable matter, noxious malaria! What could be more conducive to the health of the surrounding country, than the removal of these, along with the dense stifling growth, through which a ray of summer's sun scarcely ever penetrates?

The particular part of the valley of this river to which I allude, is about fifteen miles long, averaging, say, one and a half miles in width, excluding the bottoms of several tributary streams. Although the general character of the soil, is as stated; yet it varies exceedingly. The lands nearest the main run, and in depressed places farther off, are denominated *mud lands.* They are different in color, but all rich: being composed of the washings from the highlands above, the red, the yellow, the blue, and the white clays found on the hill-sides, and in the bottoms of the tributary branches and ravines. Independent of the supply of top soil and vegetable matter furnished by freshets, the accumulation of the last ingredient, from the growth of the land for centuries, must have been sufficient to fertilize it. The brown and chocolate colored mud land is better than the gray and ash colored; being more friable, or containing sand in a coarser form. The latter is apt to bake and to crack open when dry—neither freely absorbing nor giving out moisture. Virgin cakes of it when broken, show thin strata of different appearances, which would seem to indicate the tardy process of its formation. They are very productive in corn when the season is not too wet; but that is too generally the case, in the present condition of the swamp. Nor is it safe to seed them in wheat; for it will be winter killed; and if it were not, would be sure to grow too rank and fall, or take the rust. I know of but few instances of the success of this grain on these lands. It has succeeded pretty well with several farmers on lands somewhat of this character; but only after they had been well reclaimed, and tended sometime in corn. Oats do rather better; though unless sown quite late, they are liable to fall. The most congenial crop seems to be herds grass. When the ground is well prepared and properly seeded, the crop will range from six to eight thousand pounds of cured hay. Timothy succeeds well. The objection to it is, that it fires or burns up, in this hot climate, and will not, like herds grass, wait for the farmer.

A grass has spontaneously sprung up in these lands, and been propagated by several persons, who esteem it highly. They call it the blue grass, from its rich glossy blue appearance, both while growing, and after cured into hay. It rises from three to five feet; stem nearly flat, and about the size of a goose quill; leaves numerous from top to bottom of the stem, and from six to twelve inches long, half an inch wide near the boot, smooth and tapering. It puts forth a thread-like flower stem out of the boot of every leaf, which rises and branches off like the head of the oat, bearing numerous small seed. This flower is of a richer purple than the leaf or stem. I do not know its botanical name, and if I did, it is probable that this plain description would suit my purpose in describing it, even better. I am highly pleased with it, because it is said to delight in wet land, conquers every thing else, even the bullrush

and the broom sedge. All the Chickahomony lands, rich and poor, dry and wet, put up the sedge very soon after the most careful preparation. Meadows as thickly set in herds grass, as the teeth in a card, become entirely overrun with it in a few years (say six) and require a hoe crop and re-seeding. We all know what a pest the bullrush is! The blue grass makes coarse looking hay, though stock are very fond of it, and seem to eat the stem, as though they relished it as well as the blades. Never having cultivated it, I know nothing of a supposed difficulty in curing it, owing to the size of the stem. Yet I can conceive, that laying more open in the swath, as well as in the shock, the air would find a more free circulation through it, and enable you to stack it as soon as fine grass. Every body knows, I presume, that air-cured hay is better than that cured by the heat of the sun.

Another portion of these bottoms, rather more elevated than the mud lands, is ash colored, stiff, liable to bake, and retentive of water. The crops are apt to be very light either in wet or dry seasons. Should the elements be favorable, and the owner very industrious in keeping it clean and finely pulverized, it pays pretty well in corn. But it might do better in grass or pasture. It is generally speaking less valuable than highland—and there is much of it in this valley. Putrescent manure will act favorably, but for a short time. The pewtery mass soon runs together after being lightened, pulverized and manured. Nothing but very coarse sand or coal ashes will change its stubborn nature. The latter makes it rich.

Nearer the hills, and wherever the land is free from inundation, and not so retentive of water, the soil is light and friable; and frequently has an excess of sand. All of this on both sides of the swamp, has been cleared, by former generations. If we judge by its present crops, it must have been originally rich. Below the New Kent line the low grounds grow gradually wider, the soil lighter and more sandy. Of that part of the valley I know nothing.

Perhaps the flats on no stream in the state, present such diversities of soil as those of the Chickahomony—nor are they, any where, so irregularly dispersed. And the fields in many places, have been cleared in a corresponding manner. When the sluggish run (for it is not a river,) shall be well opened and straightened, and the superabundant water conducted off, these inequalities in the productiveness and the value of these lands will be lessened—a stimulus will be offered to the owners to clean up and drain all the low wet spots, now grown up and disfiguring their farms—the rich virgin land, now useless, except for timber and fuel, will be cleared and cultivated, yielding great profit, and furnishing the means of enriching the exhausted highlands. When the whole of this extensive valley shall be brought into neat cultivation; interspersed with verdant meadows, green fields of corn and ripening harvests, what a beautiful spectacle will it be from the lofty heights, to the eye of the metropolitan! From the centre of the city he may reach and enjoy it in half an hour's ride.

This, for the present, is indeed a fancy picture. But when Richmond shall contain a population of sixty or seventy thousand, and its commercial capital be trebled and profitably employed, the demands of its markets, aided by some of its enterprise and money, will convert this fancy into reality. I have at hand, no means to ascertain how many thousand bundles of northern hay, are annually sold in Richmond. The quantity is very great, considering the population. That article alone, will justify the reclaiming of the lands on the Chickahomony! One acre adapted to meadow, and cultivated in the best manner, will not fail to make six thousand weight; which at seventy five cents, (the lowest regular market price, for the best hay,) amounts to $45. Deduct $10 for cutting, curing and hauling to market, and you have a clear income of $35. Now what is that acre of land worth, which pays interest on $583?

Not more than one-fourth of this bottom is, however, capable of this production, and then only, after much pains and expense in preparation and seeding—more indeed than its present cultivators have bestowed. It must be confessed that the original clearing and preparing of the soil is laborious and expensive. This is about compensated though, by the value of the wood and timber, except where the wood is too distant to bear carriage to market. It is my opinion that about one-half of the whole body of low grounds (within the limits alluded to) is capable of producing three thousand weight of hay per acre; perhaps it would average four; while the richest would yield about 8500. Only one crop of artificial grass is cut annually—the second crop has no chance to grow until the fall rains and mild temperature commence; for the first is mowed just at the commencement of hot weather.

Considerable quantities of hay are made from wild grass which springs up abundantly in land that is wet. It is quite coarse, but yields two crops generally; and especially, when the first is cut early. It finds a market at fifty cents, and sixty two and a half cents. Some of it is pretty good. It seems to suit particular tavern keepers and keepers of livery stables; whether on account of the price, or of the certainty that horses are not so fond of it, or from both these considerations together, I do not undertake to say.

The blue grass yields also two crops—both of which put together, perhaps are greater than the best single crop of artificial grass. It, like the herds grass, will wait a week or two for the mower—and I am disposed to think, it will take the place of all other grasses on lands adapted to it. In fact it is rapidly springing up in meadows where it never was sown, and quite remote from those in which it is cultivated or encouraged to grow. Orchard grass does not succeed, but the feather grass grows luxuriantly, though I think the hay light and chaffy, (to use that expression.) A mixture of timothy and herds grass, seems to me, to be well calculated for all the artificial meadows in the lower country. The latter, when ready to be cut, is apt to fall, and would be greatly sustained by the stouter and stiffer stalk of the former, which in its turn would be less liable to burn or dry up, when shaded and protected, as it would be. In three or four years the timothy will be rooted out by the herds grass, and in this climate, the best meadow will not last more than six or seven years and be profitable.

It may be well to say something about the mode of preparing and seeding an artificial meadow; and what I shall say on these subjects will be

equally applicable to the whole of the country below the mountains. There is scarcely a stream in this whole region that does not afford some excellent meadow land; and there are numerous wet slashy spots, in the levels of the highlands that would produce fine crops of hay. Lower Virginia, though almost exclusively a grain growing country, is often, and particularly in some parts of it, very deficient in rough or long food for stock. Fodder (or corn blades) is the main dependence for sheep and horses; and shucks and straw for cattle. I have long thought that blade fodder was not worth half the cost of gathering and saving it; unless the corn be remarkably fine. And even from such corn, the weather must be very favorable to secure it with its nutritive juices. If I had no meadow, nor knowledge of hay, I might think otherwise. (This is a plain matter that ought to be fully discussed and experimented upon.)

Land for a meadow ought to be rich and moist; or at any rate, retentive of moisture until the middle of June. The soil must be ploughed and harrowed until finely divided. The aid of a roller will in many cases, greatly facilitate this operation. But it ought to be complete, and the land made as level as possible, in order to lighten the labor of the mower, and enable him to get the whole crop of grass. The depth of the first ploughing should be regulated by the depth of the fertile soil. Deep stirring of the earth is necessary; for the deeper it be broken, the more moisture it will absorb, and the more it will give to the roots of the grass. All the roots, trash and tussocks must be carried off—they are the nurseries of weeds, and will be in other respects injurious.

The seed ought to be sown after the last harrowing and before any rain has fallen. A bushel of herds, and one gallon of timothy seed, or rather less will be sufficient per acre, if sown in September, or before the middle of October. If sown in the spring or summer, half a bushel more of herds ought to be added. But there is no danger of sowing too many seed; and I should never stop under two bushels, provided the seed were not too costly. Though what is a little expense, compared to a thick luxuriant crop, which shall entirely possess the ground, to the exclusion of every other growth? Grass when sown too thick, will (and only on rich land) thin itself exactly to that point which insures fineness and the greatest production of which the soil and climate are capable. Many grass growers have labored under a strange delusion on this subject. It was the practice with some (of my acquaintance,) to sow only one peck on an acre. The consequence was, that they had to lose one year, waiting for the grass to spread, and supply the stinted seeding—cutting the first year a rank crop of weeds, mixed so sparingly with hay, that the produce was but of little value, except as horse bedding. The cutting of such a crop is heavier work than of good hay. And experience proves, that thinly sown meadows will always remain foul, and give inferior crops.

The seeds having been thoroughly mixed together with the hand, are then sown in a dry state, by the hand also after the manner of small grain; the ground having been first marked off into six feet lands by using a hoe or rake handle. Horses ought not to go on the ground thus prepared; and if the lines laid off, as recommended, be not mathematically straight, they will sufficiently guide the seedsman, who ought to follow just behind the operator, and while his mark is fresh. This will insure regularity. The sower's hand ought to be held low, and particularly if there be any wind. It is better to sow the seed dry, because then they separate easily, and fall more regularly. Being white, they ought to give the ground an evenly powdered appearance, which is the only sure proof of good sowing, excepting always the appearance of the grass itself—and slighted spots should be resown by both of these indices. Herds grass seed are so small and light, that they are very apt to be taken up and thrown about and deposited in sunken places, if not carried off by the winds. To prevent this, the roller should follow the seedsman as soon as possible. In addition to this benefit, it beautifully levels and smooths such finely prepared ground, and leaves it, so that the grass knife passes over it without obstruction or jar.

How interesting to the eye of the husbandman, is such a plot of land, thickly and evenly covered with a rich coat of grass, in full bloom! Then is the time to apply the knife, and handle the fork. An experienced and dexterous cutter will be enabled to shear it smoothly and evenly, and with as much apparent ease as the city barber wields the instrument of his vocation.

The second crop, as already suggested, does not rise high enough in this climate to be cut. But it affords the best of grazing. In its growth it steals along, alternately freshened up by showers, dews, and cool nights; and parched and withered by the burning sun of summer, until released from this doubtful state of existence, by the more regular and genial temperature of September. Not till then, does it assume its gay verdure, and give promise of future vigor and value. A certain union of heat and moisture is necessary to every sort of vegetation, and every clime is characterized by its peculiar productions. In the temperate zone, we regard spring as the flood, and winter as the ebb-tide of vegetable life. Summer and autumn are the seasons of their vigor and maturity. But it is both interesting and instructive to note the effect produced by the removal of plants from one latitude to another, within our zone. Some of the artificial grasses so called, which preserve their verdure, in the northern states, and even beyond our mountains, during the whole summer, die and are withered to the very ground, by the heat of the sun in the lower and southern country. To them autumn is a second day of resurrection. Hence they yield us but one crop of hay, and seem to be incapable of that degree of acclimation that would enable them to produce two, notwithstanding all our care. We have vainly endeavored to nurse into usefulness, the *guinea grass*, which has been pronounced to be to the West Indies "the next great blessing to the sugar cane." These considerations make it desirable that some native grass should take the place of exotics. The blue grass promises to do this on very rich and wet lands; but a little more experience with it ought to be had before we give up the herds grass, which we know to be valuable either on the wettest or the dryest land.

Unless the second crop, or aftermath, be grazed down, it dies in the winter, and forms a thick covering of dead material that retards the early

growth of the spring crop, impedes the mower, and injuriously mixes with the hay of the next crop, as it must be cut with it. On a new meadow, this covering in favorable seasons, will rot after the grass rises over it in the spring—but this is not often the case. It has been the practice, with many farmers, to burn it off early in the spring. The objection to that, is the probability of empoverishing the soil. But on the other hand, such heavy grazing as will be necessary to consume and trample it completely down, is attended with the pernicious effect of poaching, or making the ground too hard; and when that is the case, the crop becomes short and meager. When the ground is dry, grazing may be permitted, though never in wet weather, or when the hoof breaks, or much indents the sod. At the time, however, when the grazing of meadows, in this climate, would be most profitable, grass is abundant enough in the fields. The plan of a standing pasture, with an occasional use of the meadow in the fall, would seem most advisable. Still I am inclined to think, that burning once in three years, would be more beneficial than injurious.

Although the months of September and October are the best for sowing grass seeds, it may be done, in my opinion, any month in the year, provided there be no danger of the waters covering the land and removing the seed. When sown in the spring or summer, or too late in the fall for them to vegetate, the first crop will be more or less mixed with weeds. I sowed a few acres some years ago, with oats. The grass came up remarkably well. After the oats were cut, we had very dry and warm weather. I examined the fate of the grass, and found that before the heavy crop of weeds, which succeeded the oats, had protected it, the young grass had been completely killed. It had risen two or three inches; and though sown very thick, appeared to be entirely destroyed. The ground was as dry as it could be, and I could see no sign of life in the roots. This soil when moist, is as black as lamp-black; light, and contains much sand. Notwithstanding these appearances, the grass put up slowly in the fall, and in the spring, occupied the ground, to the exclusion of every thing else. The crop of hay was a good one, though much injured by the stalks of the weeds that ought to have been cut off in the fall.

Excuse the digressions and diversities of this long letter. They are characteristic of my mode of thinking. The subject is but only broached. For the present, let this suffice. I had intended giving you a topographical and agricultural delineation of the country from the James to the Potomac River. May I not call upon the strong pens and intelligent minds in the several intervening counties to aid in this work?

C. W. GOOCH.

For the Farmers' Register.

DESULTORY OBSERVATIONS ON THE SOILS AND AGRICULTURE OF HENRICO COUNTY.

The lands in the county of Henrico vary probably, more than in any other county. Those of the Chickahomony bottoms have been described [page 649.] The hills that overlook these, are higher and more precipitous on the Henrico, than on the Hanover side, and abound more in gravel and clay. Some of them are quite steep and gashed by very deep ravines, in the bottoms of some of which, opposite to Richmond, deposites of fossil shells have been found, consisting of clam, scallop, oyster, and a great variety of smaller shells; so far decomposed that they may be reduced by the pressure of the hand, and when exposed to the atmosphere, fall into powder in a few days. Expecting that these deposites will be examined by the ardent and skilful Professor Rogers, I shall say nothing more about them, except that they have not been found in many places; and but few experiments have been made with them, as manure.

The soil of these hills is diversified. In some places sandy, in others gravelly, with an admixture either of yellow clay or yellow sand; and then again, for a mile, on those the soil is a rich, chocolate colored fertile mould. There is but little red clay, but frequent hills of yellow or light brown clay. The writer has found all these varieties to be powerfully acted upon by plaster, and especially when applied to clover.

Between the Chickahomony and the James River hills, the country is generally flat, but often broken by deep ravines and valleys, along which the branches pass to either stream. Several streaks or patches of red land, not unlike the soil of the South West Mountains occur. They are however, far from being as rich; yet are susceptible of high improvement. They suffer greatly from drought. There are similar portions, with a gray or ash colored soil, of nine or ten inches thickness, resting on a red clay foundation. The soil of these portions suffers less from drought, retains manure longer, and seems to have been originally surer in production, if not actually so rich. The top soil abounds in silex in a fine form, and I presume, had in its virgin state, a due proportion of vegetable matter. But shallow ploughing, a hot sun, and close grazing, have brought these portions to poverty, and made them the favorite spots for the poverty, or hen's grass. The clay from below, after being exposed to the frost and scattered and mixed with the silicious soil above, seems to be in some places almost as good, and I think has a more permanent effect than barn-yard manure. To dig up, prepare, and scatter this red clay, would be very expensive, though less so, than the raising and use of putrescent manure. This operation might be effected by the plough, but then without a good coat of vegetation to turn under in its green state, sterility would be the consequence for a year or two. Indeed the plough cannot be easily made to reach the red substratum and throw it up uniformly, without running a two-horse, directly in the furrow after a three-horse plough and few persons are disposed to incur this expense. There is a great deal of this sort of land in Virginia. If a sufficient crop of clover cannot be made to grow on it by Mr. Sampson's mode of lightly top-dressing small grain, at, or just before the time of sowing clover seed, a crop of peas, buckwheat or rye, might be turned under in a green state, by a double ploughing, as suggested. But from the experiments I have made, winter grain neatly put in and top-dressed with farm-yard manure succeeds well. The manure seems to be more beneficial in this, than in any other mode of applying it, and secures to a certainty a good crop

of clover. The improvers of exhausted land in every part of the state consider their work nearly accomplished as soon as they can get it well covered with red clover. Good ploughing, a proper rotation of crops, and non-grazing, with the use of plaster, have seldom in such cases, failed to restore the soil to its original fertility. To go beyond that, requires calcareous matter or heavy dressings of putrescent vegetable or animal manures. I have an old field of this sort of land that put up, when I took possession of it, nothing but hen's grass. The soil was originally very good; but it had been worn down to the lowest point of sterility. From the very promising appearance of the substratum, I thought that it could be renovated by good ploughing, and the use of plaster, so as to produce clover. It was accordingly ploughed from four to six inches deep, sown in oats, clover and orchard grass, plastered at the rate of a bushel to the acre. The oats were very inferior to what I expected, but better than anticipated by those who knew the land. They were, however, not sown until April; for I did not take possession until late in March. The clover came up very badly, and except upon some portions of the field that had been partially manured by the former owner, was an entire failure. The grass seeds sown on this field cost me $152. Having as much rich land as I had force to cultivate, and reclaim, I determined to let this field as well as others on the same farm, rest and take the chance of gradual improvement by time, and one or two ploughings, until I could take hold of it. In 1829 the whole field was first treated as above stated. It rested two years, and in 1832 was in wheat—crop very inferior, except where my small stock of manure was put—a third of the field was not worth cutting, and was left to rot on the ground. It rested in 1833 and 1834. The visible improvement that has taken place in the appearance of the land—the thicker cover of vegetable matter including strong and bold weeds—induced me to commence ploughing in the winter, to put it in corn this year, to be manured in the hill, with farm-pen manure, ashes, plaster, &c. It has been unavoidably pastured, but not heavily during the years of rest. If, in 1829, the plaster had been sown before fallowing, or just before the harrow that put in the oats, the improvement would, in my opinion, have been greater.

About twenty acres of this field have been kept under a different system, both for convenience and experiment—divided into two plots. No. 1. was the richest part of the field, as it had been manured slightly by my predecessor—No. 2. was quite as poor as the average of the whole.

Plot No. 1. 1829. In oats clovered and plastered—crop a fair one, equal to average in the neighborhood.
" " 1830. Clover—cut most of it—very irregular in growth from uneven manuring formerly.
" " 1831. Clover—pastured by calves, &c.—greatly depreciated.
" " 1832. Manured before the plough and put in wheat with rest of the field–crop excellent–though still very irregular.
" " 1833. Wheat again—crop more productive and not so irregular.
Plot No. 1. 1834. Rye—crop comparatively good—sown too thick—though the field, more than ten for one of seed.
Plot No. 2. 1829. Oats, clovered and plastered—crop inferior, just worth cutting.
" " 1830. Clover—crop inferior—cut but a few hundred weight, and that in spots.
" " 1831. Clover—plastered like plot No. 1—clover almost entirely disappeared.
" " 1832. Wheat—crop very inferior—hardly worth cutting.
" " 1833. Corn—lightly manured in the hill with corn-stalk and farm-pen manure—crop not measured—supposed about three barrels to the acre—and as irregular as the different parcels of manure.
" " 1834. Wheat,lightly top-dressed with farm-pen manure, when frozen, or there was snow on the ground—crop about ten for one.

You will observe that the plot No. 1. has been in small grain the three last years, and has been tended four years in six. The whole manuring would be about equal to one good dressing of manure: yet the crops have been quite respectable—and the clover is at this moment (23rd February) so promising, (without ever having been seeded, except in 1829,) that I intend plastering it, and exempting it from the corn crop intended for the whole field. Plot No. 2. was the poorest—has been four years in crop, and one a corn crop. Still the light top-dressing given to the last wheat crop, has caused the clover to appear (though sown in 1829,) so thick and vigorous, that, by a single plastering, I expect to make a fair crop, which will bear one cutting and keep the land improving until the whole field can be brought to the same point of improvement.

These plots have been thus managed, because they are very convenient for the employment of the idle servants about my yard, &c.; and it was easy to use the manure on them, while more important and distant operations called for the use of all the two, and four-footed force, I could command. Another reason influenced this course: these plots had become excessively foul with highland blue grass, wire grass, running briers, &c.; and they are not half exterminated now. The plastering given the whole field in 1829 seemed to give a sort of magic existence to these pests. The running brier, or dewberry, is a great annoyance on this whole field. It is worse than the sassafras; for that can be destroyed by cutting it down some inches above the ground with a brier knife twice in one summer, or by putting hungry animals to eat off the leaves and prevent the atmospheric elaboration of sap through the leaves, without which, plants and vegetables soon die. This brier, is not so, the plough does not go to the bottom of its root, and when cut off nine inches below the surface, it puts up three or four shoots instead of one, that will run ten feet in a season, and, with the least encouragement, take root, and propagate new nurseries. This is one of the evils of resting land, without grazing. But I believe that this

brier delights in the gray or silicious soils more than any other—and especially, if they rest on a a red clay foundation, into which the roots can freely penetrate.

In reclaiming poor, worn lands, I am satisfied that the little manure we can raise and employ, had better be used as a top-dressing on small grain, in the manner recommended by that highly respectable, sensible, and practical farmer, Richard Sampson. [Far. Reg. vol. i. p. 58.] The manure goes much farther, used in this way; and what equally recommends the practice is, that it may be hauled daily and fresh from the stable or the farm-pen all the winter, and *until* late in the spring, provided it be broken to pieces, and scattered pretty evenly. It will not answer to spread it on hard ground; but on small grain, or ploughed land, it seems to lose nothing by evaporation. The rains dissolve the valuable qualities of the manure, when sufficiently rotted, and the ground absorbs them—leaving the fibrous parts a sort of protection on the soil—and, if not sufficiently rotted, that process will take place as soon as the agents of heat and moisture, and the shelter of the crop become sufficient. New manure, if made fine enough, will thus give to the land and the crop much of what it would lose in a complete, or even partial fermentation in the manure heap.

Of the ash colored, silicious soil of the field alluded to, I took, in 1831, one acre—manured it—ploughed it nine inches deep, just touched the red clay—it was finely divided by the harrow and other ploughings, and then cultivated in vegetables. The product was very great. I never saw finer summer turnips, (Early Dutch,) Irish potatoes, or ruta baga turnips. They were cultivated in drills; and with less trouble than corn. After the land was well ploughed &c., a two-horse plough opened furrows three feet apart. These had coarse farm-pen manure put into them, and the potato was cut into four or five pieces, rolled in plaster to absorb moisture, and prevent rotting, and dropped along on the manure and were covered by a single stroke of a one-horse plough on the furrow-side of the two-horse plough—furrow just tumbling in the ridge of the larger mould board. In the other furrows I put the potatoes, and then the manure on the top, and covered as before. Two furrows with the plough and one with the cultivator was all the tillage; the plough hilling up on both sides as it went. I saw no difference in the growth; but, while the potatoes planted on the manure were larger, dryer, and more easily dug, those planted under it were more numerous; and from not being so *large* might have been the most profitable crop: any difference in *quality* on the table could hardly be perceived. The ruta baga were as good and quite as large as I ever wish to make. All the other vegetables were equally fine, except some sweet potatoes that seemed disposed to run too deep into the ground to be of good size, and gave much trouble to the hand who dug them—though some were planted on hills and some in drills. The next year lot No. 1. and the whole field went into wheat. The part of the acre in ruta baga was left out, being near a new farm-pen; for at wheat seeding time these *northerners* have no idea of being cooped up in a cellar or a barn, or a huge pile in the field, and were growing finely; and I could not think of "putting them in Coventry" at the very moment when they appeared to be thriving so well, notwithstanding the puny frosts of our fall climate, and the variable heat of the sun. They were gathered just before Christmas. Another coat of coarse manure was put, broad cast, on this slip, and it was ploughed, in some good weather in January. I did not design this apparent waste of manure; but as it had been made by the overseer, the ground was put to its highest capacity for production. It was ploughed again with a double plough, the other way—then harrowed, rolled, ploughed with the single plough, and seeded in oats at the rate of five and a half bushels to the acre—and then it was harrowed close, once each way. The product was enormous. The oats rose about three feet high, and stood so thick, that after harvest, the stubble looked thick and even, and not unlike the stubble of a rich and well mowed meadow. Some of the oats were fed away without my knowledge—the rest were thrashed out by a thrashing-machine, and measured. I will not state the number of bushels of clean oats; for I am sure it would awaken the incredulity of those who are accustomed to ten and fifteen and even thirty bushels to an acre. The same lot has been prepared and will be put in oats this spring.

These experiments show the capacity for improvement, and the productiveness of this sort of land. It is obvious, however, that under severe tillage it requires repeated manurings; for it becomes so light, that the atmosphere penetrates freely quite to the more compact substratum, and the roots of plants easily spread in every direction in search of food. It is colder and more backward than a sandy soil; yet quicker than any of the varieties of clay. Heavy rains make it miry without running together, and the top soon dries without excessive baking.

A great part of the Henrico lands are flat and *livery*, and retain the rain-water on the surface—top soil (where there is any) is ash colored, with a portion of silex in the form of impalpable powder, resting on a foundation of pipe clay. The growth is mostly whortleberry, black jack, gum, tough fibred white-oak, &c. It is very difficult to free this land of the superabundant wafer. The frosts and rains of winter sometimes run it together, so as to give a field a glossy, pewtery appearance. It is not productive, of course, and is difficult of improvement. Coarse sand, lime, and coal ashes, have been found very advantageous. One gentleman has drained a field of this "crawfish land," and by the free use of coal ashes in the first instance, and then other manures, has made it exceedingly fertile, producing heavy crops of hay, as well as of grain. His vicinity to Richmond enables him to do this at no great expense, and he is now reaping the reward of his skill and industry. The land in the vicinity of these pewtery sections, is rather better in quality, but partake very much of the same characteristics.

The James River bottoms, in the upper and lower end of the county, are rich and valuable, and are cultivated with skill and profit. Though the bottoms in the neighborhood of the Great Falls are less valuable, being more light and sandy.

The farmers in this county have greatly improved in their modes of tillage and management, within the last seven years. They make and spread more manure, use better ploughs, and sow more grass seeds, than formerly. When they

shall be convinced of the action of plaster, and adopt its free use on such lands as are adapted to it, the improvement will be more rapid. It will cost them but little, since the hauling, so very expensive to the upland farmer, will cost them nothing. Its benefit to clover, wherever that can be made to grow, if sown when the clover is four or five inches high, ought now to be conceded by every one; no matter what be the nature or locality of the land. The prejudices against this manure have arisen, in too many cases, from the vast quantities of utterly worthless gypsum that have been sold in our markets. No one can judge of its qualities when ground, without the aid of chemical tests—but in the lump, nothing is easier. Perhaps there is scarcely any difference in the value of the blue and the red. The lump should look rich and oily. The more isinglass the better. Those lumps that have a white, dry, husky appearance, are little better than so much chalk. The appointment of a vigilant inspector of plaster, might prevent the importation of the inferior article. I have found it to act more powerfully on all our gravelly knolls and hill-sides, than on any other land. I have, however, never used it to any great extent; though familiar with its use in the upper country, for twenty-five years.

The granite ledge of rocks that cause the falls in all our principal rivers, passes off from Richmond in nearly a north direction, showing itself in this county where the old stage road to Fredericksburg, crosses the Brook Run and the Chickahomony. Above this line, both free stone and granite are often found in abundance; but not below. Below, we sometimes meet with rocks of a reddish or yellow color, that appear to have gone through powerful fusion. These are not often found so numerous as to interfere with agricultural operations. The great coal field of Virginia also passes through this county a few miles, say eight, above the ledge of granite rocks; and there are several pits, that have been some time profitably worked. But these matters belong to the geologist.

Many enterprising persons have taken hold of small farms, from thirty to one hundred and fifty acres, immediately in the vicinity of Richmond, and in some instances, six or seven miles off, and have improved and beautified them very much, within the last fifteen or eighteen years. The great majority of these persons either reside in Richmond, or are engaged in business there. The changes since 1813, when I first carefully examined the country around that place, have been strikingly great. In many places, enterprising men have committed the whortleberry bushes and grubs and roots to the flames—sent the scrub pine, black jacks, and mossy gums, as wood to market—turned the frogs out of their element, and starved the craw-fish—putting in the stead of these, alternate crops of luxuriant grass and grain. Hedges and ditches, and plank enclosures, have taken the place of the old worm fences—young orchards and vineyards are beginning to yield both delight and profit—and neat cottages smile amidst the foliage of choice ornamental trees. The most of these changes are only the ground work, the commencement of what another twenty years may complete. The operators on a large scale, are more distant from the city, and have only aimed at the melioration of the soil, and the production of the more necessary articles of comfort. But there is gradually spreading a spirit of improvement in every thing connected with horticulture and agriculture. Market gardens and dairies, those indispensable sources of good living in a city, are fast increasing and improving; and if Virginia is not to be actually given up to the occupancy of wild beasts and talking politicians, her people, every where, will bestir themselves to make the most of the great natural advantages which providence has bestowed upon them, and upon which too many of us have lived, like prodigal heirs, upon the wasting legacy of a provident parent. Virginia! yes, devoted Virginia! presented and sacrificed upon the altar of patriotism, a rich, a glorious empire. Under the same feeling, and too confident a reliance on her own virtue and power, she has permitted her veins to be opened, and for more than half a century, looked upon the outpouring of her life-blood, without efforts to stop it. She has seen almost a new world peopled by her *working* population, her youth of promise and of genius! But for the *hope of a change* for the better, in her public policy and its necessary effect on domestic interests, we should soon have seen our country thrown back far beyond any intellectual condition we have ever held. We might have retained an ignorant, oppressed mass of citizens, obedient to a few lordlings, who would do as *they please*, no matter whether their vassals approved or not. We might have offered the very best arena for hunting the fox, the deer, the bear, the panther, the wild boar. We might have eclipsed Arabia in the beauty, the fleetness and lastingness of the race horse. Yes, we might even have out voted any one of more than a dozen states in the union, and still have been flattered by mock appeals to our renown and moral influence!

But in despite of our supineness and apathy, circumstances and the march of improvement in other states, appear to be elbowing our legislature and people into motion. Some valuable channels of intercommunication have been already opened. When the Roanoke shall be finally improved—when its rich staples can, cheaply, seek a market either in Norfolk or Petersburg—when the northern extremity of the Great Valley beyond the mountains shall have the choice of the District or the Baltimore markets—when the cis and transmontane region nearest to Fredericksburg, shall have easy access to that fine town—when the great central improvement by means of the James and Roanoke shall, with its lateral branches, offer the Richmond market to the Ohio country and East Tennessee—when a line of rail roads and steam boats shall connect the extreme north with the extreme south of the union—when all these things shall occur—and *circumstances* are rapidly bringing them about—our situation will be essentially different. New life, new animation will be imparted to the whole state. Richmond already feels the spring of such a hope. Nature has designed for that place, a destiny beyond the ken of any living man. A climate as salubrious as any within our zone; alike free from the rigors of the north, or the enervating sickening heat of the south—favorably located for commerce—a great tobacco and wheat market, and within reach of immense supplies of cotton—with sufficient water power to manufacture for half the union—exhaustless beds of coal near at hand—and the nearest

port to an immense and fertile region of the west —with all these advantages what has she not to hope? The surrounding country we have seen is capable of improvement; but it depends upon that city to give it value; and as the one flourishes, so will the other.

The passage of the James River and Kenawha bill by this legislature, and the spirited operations that have commenced on the rail road to Fredericksburg, have put fresh life into many. The necessary expenditure of money, and consumption of provisions and lumber, &c., are not so stimulating as the anticipated results of these great improvements. Henrico in her horticulture and agriculture will be immensely benefited. And it is in this point of view, that I have felt justified in making this digression: and the more so, as similar benefits, though in rather less degree, will result to the whole country that trades to Richmond.

C. W. GOOCH.

Henrico, February 28th, 1835.

LUMP PLASTER—HERDS GRASS.

To the Editor of the Farmers' Register.

Louisa, Feb. 9, 1835.

Enclosed I send you five dollars to pay my second year's subscription to your valuable work, the Farmers' Register. I am much pleased with it, and wish it an extensive circulation, because I think, as far as I am able to judge, it is well calculated to excite a spirit of improvement among farmers, which is much wanted in this section of country. Some few of us are using clover and plaster, and some are talking about it. But the most of us are following the example of our forefathers in this matter. As I sometimes find it convenient to get plaster in the lump, and there being no mill in this neighborhood prepared for grinding it, you or some of your correspondents will confer a favor on me, and perhaps on others similarly situated, by informing us of the best mode of preparing it, and what effect the action of fire has upon it.

In your January number of the Farmers' Register, some inquiries are made of you by a correspondent respecting herds grass, and the due preparation of the land for it. As I have been raising it for several years, I ought to know something about it. I concluded when I saw your correspondent's inquiries, that I would save you the trouble of an answer, and state the results of my own experience upon this subject. My usual time of sowing is the fall, say from the middle of September to the middle of October, and generally get a very good crop the next year. The heat of the sun is more apt to kill it, I think, when sowed in the spring. It delights in moist, though not wet land. I would advise to keep the ditches in oozy, wet land, well opened, and their banks levelled. If they become choked up and the waters spread, the bullrush and other coarse grasses will put up and destroy the herds grass. I consider it a very valuable grass. When it is well cured, horses and other stock eat it very greedily, and colts will winter very well upon it without any grain.

My method of curing it, is to let it take sun enough after cutting to make it fall, then throw it with pitch-forks into small ricks, and enlarge them as the hay cures. What is cut in the forenoon may be shocked up at night, opened loosely next morning, and by the evening it will generally be ready for stacking. As to the effect "*the growth of the grass, or its conversion into hay*," will have upon the health of persons living near, I am very sure it will not be injurious.

WILLIAM SHELTON, (*Minor.*)

THE SUITABLENESS OF SHEEP HUSBANDRY FOR MIDDLE VIRGINIA.

To the Editor of the Farmers' Register.

Within the last few years, I have learned both from private sources and from agricultural journals, that northern farmers are realizing handsome profits from sheep raising. Curiosity, if not a prospect of future benefit, makes me, (and should perhaps prompt others in Virginia,) to inquire more into the subject of sheep husbandry. I do not mean an idle curiosity, Mr. Editor, but it is that wish, which I conceive every farmer should possess, to inform himself of the facts connected with *every branch* of rural economy. Perhaps he may turn them to useful account. To say the worst of it, the information will do him no injury. I have observed in the "Cultivator," that the farmers in New York find it more profitable to raise sheep, even on land worth one hundred dollars per acre, than to cultivate it; and that lands of less value are *comparatively more* profitable in that way. A question then arises, whether our own state is not as well, or better adapted to sheep husbandry, than New England. We know that a wise providence has so constituted the animal economy, that in northern latitudes, in order to their better preservation from cold, they have thicker and finer fleeces. Yet the fact, that wool answering all the purposes for the finer fabrics is raised in the south of Europe, should encourage us in the belief that this climate is at least as well adapted to *that* branch of husbandry as a more northern. I would next inquire whether the difference between the north and the south, as grazing countries, will present a formidable obstacle to profitable sheep raising here? I believe it is true, that lands are more fertile to the north than to the south, but I believe it is equally true that *that* is more the work of art than of nature; for I think it is conceded on all hands, that our soil is naturally more generous: but our northern brethren, (much to their credit,) have more than supplied the difference in fertility. As far as my observation has gone, wherever a system of melioration has been pursued, our lands have given every evidence that they could be made a delightful grass-growing and stock-raising country. To what extent of fertility might they not be made to attain, if the hundreds of cart loads of manure which are now spread on a few acres of tobacco land, should be returned to a larger surface. Under the present system, (I allude particularly to the tobacco growing district,) the whole farm is gleaned and empoverished, that a few acres may be enriched.

We are moreover informed in the January No. of the "Cultivator," that one of the advantages of sheep husbandry is, that the lands are improved. That sheep (contrary to all my previously formed opinions,) returns so much rich manure to the

soil, that it more than compensates for what they take from it.

If then our climate is as well adapted to the raising of fine wool—and if our soil is, or can be made with no greater expense, equally productive in grass, it appears very clear to my mind, that the profits of sheep husbandry would be fully equal, if not greater than to the north: for we possess some advantages over the north, a few of which I will name. It is no small item in the calculation, that our winters are *several* weeks shorter than they are in New England, and perhaps the difference in the intensity of cold, (if we are permitted to reduce it to time,) may be fairly put down as equal to several weeks more; for every farmer knows that stock require more food in cold, than in warm weather. In this way we may state the difference to be about two months in favor of Virginia—all which time the northern farmer has to provide for his stock, from which the southern farmer would be exempt. The few sheep which I keep for the use of my farm, I have never fed in winter, except when occasionally the ground is covered by snow, and so hard that they could not nuzzle through it to the clover; and I believe they are as thrifty as any flock I have known.

The cheapness of land in the south, compared with what it is to the north, will also give us some advantage here in this matter. The price of labor being lower here than to the north should also be taken into the estimate.

Those who are better acquainted with the subject of sheep husbandry, will be able perhaps, to point out many other particulars in which we possess advantages superior to our northern friends in an undertaking of this sort.

Perhaps it may be said, (and with some degree of probability too) that such inquiries are very useless, inasmuch as all our products are commanding good prices, and our farmers are in a thriving state. To which I would reply, that such may not always be their condition, and it becomes farmers to look to all the probable sources of profit, which come within their avocation, and to use them as circumstances may present themselves.

In that portion of Virginia which is, properly speaking, the tobacco-growing section, if the present price of the article should keep up a few years, there must necessarily be some change in agricultural pursuits. It requires but little observation to see that our wood land must soon be exhausted. The enormous quantity of wood necessarily consumed in curing that crop—the unnecessary felling and destruction of timber to obtain fresh land to make tobacco of certain descriptions—and the great and useless waste which the present iniquitous law of enclosures, riveted by ignorance and prejudice, imposes upon us, must soon compel some of us to seek some other mode of profitable farming. It has hitherto been an apology for tobacco culture, that there was so great a saving in transporting that crop to market, over any other. Living at the distance from market which most of its cultivators do, that it would be a serious inroad upon the profits, if they had to transport wheat, instead: and the culture of cotton is found unprofitable, beyond contradiction. Should this section of country ever abandon the cultivation of tobacco, it is probable it may be found to their interest to substitute the raising of sheep. And many considerations would be weighed in making the exchange. To carry to market a crop of wool which would bring a given sum of money, would probably cost less (I speak without data on which to form a correct calculation,) by nine-tenths than a crop of tobacco which would return the same sum. In the article of labor too, (though of this I am also uninformed) there must be an immense saving, perhaps not less than two-thirds. Now, sir, if I can by probability, with one-third my present number of laborers, (which would enable me to sell, or otherwise profitably dispose of the balance,) and with a saving of nine-tenths of the expense of transportation, deliver to market what will yield me as much as I at present make, is it not a subject which at least deserves further investigation?

You will perceive, Mr. Editor, that I have gone upon probabilities and conjectures, and that my object is solely to elicit inquiry—to draw out facts upon which to found calculations. Should any of our northern friends perchance see these remarks, I hope they will favor us with more information than we have hitherto possessed on this subject. Let us know how many sheep are supported on a farm of a given number of acres, of medium fertility? How much clean wool they will average through a flock? What proportion of the farm is put into cultivation, and what in pasture? Is their pasture-ground frequently changed for purposes of health? How many laborers are necessary to a flock of a given number? How much and what kind of food is given them per diem? Are they put into folds every night?—for their habits would seem to indicate that they should be permitted to graze at night and protect themselves from heat during the day. Indeed, sir, we know so little about that stock that you would favor some of your subscribers by publishing in your paper whatever you can find interesting on the subject of sheep husbandry. We want to understand their management throughout the year.

W. J. DUPUY.

February 12*th*, 1835.

REMARKS ON THE COMPARATIVE ADVANTAGES OF THE THREE-SHIFT AND FOUR-SHIFT ROTATIONS.

To the Editor of the Farmers' Register.

Shirley, January 10*th*, 1835.

I have been almost ready to yield that the four-field system (with a standing pasture even) would not answer as a general system, after seeing its condemnation by such enlightened and practical agriculturists as Mr. John Wickham and W. B. H.; but upon a little reflection, I have come to the conclusion that there cannot be any thing very bad in a system which those intelligent gentlemen, and most successful farmers, have adopted themselves. For I understand that Mr Wickham has, within a few years past, adopted the four-field system on his low grounds on James River; and the intelligent gentleman under the signature of W. B. H. tells us in your No. 8 Vol. II, that he is now trying it on a farm that has been under the five-field system for ten years, and has become foul from that cause, and that it is his intention to continue it at least for a single round of crops.

Although the fact of such excellent and suc-

cessful farmers as these gentlemen (who condemn the system) having *adopted it themselves*, speaks volumes for it, I beg leave to make a few remarks on the subject. Mr. Wickham says he has been led to his remarks by the "heavy censure that is cast on the barbarous course of two grain crops, corn, and wheat, in three years, and the approval of three grain crops, wheat, corn, wheat, in four years; as if two grain crops in three years exhausted the land, and three grain crops in four years improved it;" but that is not a fair statement of the question. I only condemned the old three-shift system as formerly practised in Virginia —that is, corn the first year, wheat the second, and pasture the third—the last of which was much the severest part of the system, as the land was literally grazed to death, having no standing pasture to relieve it, and no clover of course—because if clover was sown, it would be destroyed by the excessive grazing. Mr. Wickham also says he has yet to learn that clover would succeed better after three grain crops in succession, than after two; but I imagine he has not yet to learn that it will not succeed at all after two crops of grain, and then grazed to death by cattle, sheep, horses, and hogs, not to say any thing of the rooting of the hogs into the bargain, as practised in the old three-shift system of Virginia. Now if you add a standing pasture to the three-shift system, sow clover, and instead of grazing it closely, turn it under every third year, it may be a very good system, though I do not know any one who practises it; but in my humble opinion it would not be as profitable a system as the four-shift, though possibly the land might improve under it as fast, or faster. However, of that even I am doubtful —because the three grain crops would enable you to make more manure, and give you more capital to improve with, and thereby enable you to restore the more, for the greater exhaustion of the three grain crops. Mr. Wickham again says, "the four-field system may answer with judicious management, with the aid of animal manures, lime or marl, and standing pastures, but would hardly succeed without these helps." No one pretends to say it will. The standing pasture, and extensive manuring, are parts of the system which cannot be dispensed with, (the lime, or marl would be a great addition of course, though without them the system is still a good one,) and judicious management is all-important in any system. In my communication to the Farmers' Register, on the four-field system, (Vol. I. p. 132,) I did not suggest the idea that it would suit all lands, but that I thought it a good system for good wheat and corn lands—and the idea of recommending it for universal adoption never entered my head.

The very intelligent gentleman under the signature of W. B. H. condemns the four-field system, first, "for its expensiveness." He says, "an unusual large horse-power will be required to fallow up one-fourth of the arable surface of the farm, particularly in dry seasons, &c., and the supernumerary horses that are required for that purpose, and for seeding, are kept during the rest of the year at considerable expense when their labor is not at all necessary." Now in my opinion, and I am borne out in it by the experience of my neighbor, Mr. John Selden of Westover, you can fallow a fourth of a farm every fall with the same team that you would require to plough a third of the same farm for corn in the spring, and cultivate it through the summer. For instance, on a farm of four hundred acres in the four-field system, and standing pasture, twelve mules and twenty oxen, if the land is strong, and stiff, but if light and clean, ten mules and twelve oxen would be sufficient to fallow one-fourth, or one hundred acres every fall—to sow two hundred acres in wheat, and cultivate one hundred acres in corn every spring. The oxen in the fall are in good order and efficient when the most work is to be done. In the spring the horses, or mules are the only efficient animals on a Virginia plantation, the oxen having gone through the winter are poor,* and unable to work until they have had the summer's run on the pasture.

On a farm of four hundred acres in the three-field system, it would require as many as twelve horses or mules (the number of cattle or oxen would be about the same in both systems,) if the land was strong, and stiff, but ten if light and clean, to break up one-third, or one hundred and thirty-three and a third acres, haul rails, wood, &c. during winter, (having one-third more fencing to do in the three-shift system than the four-field, as in the four-field system you divide the farm into two equal parts, and in the three-field system into three equal parts—) and tend your corn during summer. After your crop of wheat is thrashed out, which is generally by the 5th or 10th of August, in the three-field system, your horses are idle until you can cut up your corn for sowing wheat, which is generally not sooner than the 25th of September or 1st of October; and the very thing that W. B. H. complains of in the four-field system occurs—that is, the feeding idle horses: whereas in the four-field system, your teams are fallowing, and your oxen come much more into play in the four, than in the three-field system, as they are in good order and strong in the fall when most wanted for the four-field system, and in the winter and spring they are poor and weak when most wanted for the three-field system, having then, as I said before, more rails to haul, and more land to break up.

The second objection of W. B. H. to the four-field system is, that the "more valuable crop of corn is sacrificed in part, to the crop of wheat, which is less so." W. B. H. I imagine, is rather singular in his opinion as to the value of the two crops—wheat and corn. As precarious as the wheat crop is in our climate, he will find on an accurate examination of the relative prices of the two crops, that the same land would have produced much more profit in wheat than corn for the

*Though it may appear to be very bad management to let the oxen get poor, and weak in the winter, so as to require a run in the pasture during summer to enable them to fallow in the fall, yet in my opinion, it is sound policy. In winter on a Virginia plantation there is very little for oxen to do. and if you were to attempt to get your oxen fat after the fallowing and seeding season was over, and keep them so all winter, they would "eat their heads off" every winter: so that if you can can keep them in tolerable order on your wheat straw, chaff, shucks, and other offal during winter, when they have very little work to do, and give them the run on the pasture during summer, they will get fat and strong for your fallowing in the fall, and not cost you a cent in food, but convert your offal into manure for you.

last fifteen years—wheat ranging from one to two dollars per bushel, and corn from forty to seventy cents per pushel; and I recollect one year when it was down to thirty cents per bushel.

The objection of W. B. H. that the four-field system gives little or no corn for sale, I think, is a mistake, for it will give at least as much corn per acre, which will be as much as the three-field system, *minus* one-fourth for sale; and it will give double as much wheat for sale at least. I say it will give as much corn per acre very confidently, because it will enable you to manure so much more land, having so much more straw wherewith to make manure; so that you will be enabled to manure a much larger portion of your corn-field; and although the corn is after a crop of wheat, it will be equal or better in consequence of the larger manuring, than in the three-field system; and I imagine no one will doubt that one hundred acres of clover fallow, and one hundred acres of corn-field wheat, will yield double as much as one hundred and thirty-three and a third acres of corn-field wheat—however better the corn-field wheat may be in the three, than the four-field system.

The fourth and only sound objection to the four-field system is, "that the three grain crops in succession is opposed to the experience of all good cultivators both in this country and Europe"—and this I admit is a defect in the system; but there are few things in this world without some defects, and we who contend for the system, think it has as few as any other. Besides, we think, that the large quantity of manure made under this system does away in a great measure the bad effects of the three grain crops in succession.

W. B. H. prefers the five-field system, "if a part is to be cut off for pasture." To the five-field system I have no objection, except that it requires too much fencing, requiring five fields to be fenced in, instead of two divisions, as in the four-field system. When I first altered my system from three to four fields, I was very anxious to adopt the five-field system, but for the fencing. But there is no difference in favor of the five-field system as to exhaustion, unless you have a standing pasture, (and then it would be six fields,) you are compelled to graze one of the fields at all seasons, wet or dry. Our four-field system with a standing pasture is somewhat of a five-field system itself.

W. B. H. says, "the four-field system was practised at Dover in Goochland, long before it was tried in Curle's Neck, by a Mr. Harding, who leased the estate, and that it was found to be in a very empoverished condition by the gentleman who succeeded him." But W. B. H. does not tell us whether there was a standing pasture, and whether he used clover and plaster as a part of the system—(which I imagine was hardly done by a tenant—) and we cannot admit it to be the system we recommend, unless combined with a standing pasture, the fourth of the land annually sown in clover, and plastered, and made as perfect as the system is capable of. Then if it fails we will give up. I understand however, that this very gentleman, (Mr. Harding,) after leaving Dover, purchased an estate on James River not in very good condition, and put it under the four-field system, with the use of clover and plaster, and that he improved it very much under that system; and when he died, he left his estate in a very high state of improvement ,and what is more, he left the reputation of being one of the best, and most successful agriculturists in all the state of Virginia.

W. B. H. remarks, and very justly too, "that "Arator's" four-field system is the very best system in the world for thin lands." That has been my opinion for many years; but on land of tolerable fertility in this part of the country, it soon becomes too foul, and the profit is too small for good land. It is the best, and only system for our poor forest lands, and should be adopted by every farmer whose land will not bear a more rigid system.

HILL CARTER.

SHEEP MANAGEMENT AND PROFITS IN LOWER VIRGINIA.

To the Editor of the Farmers' Register.

Mantura, Surry Co. Feb. 12, 1835.

I took up the last number of your Register this morning, and in glancing over the vignette on the cover, I was surprised to see that the sheep had been left out, not by design I hope, as I should be sorry to see an animal to which I am so partial, and one to which we are all under so many obligations, treated with so much neglect. I will give you in a very succinct manner, my mode of managing sheep, and if you think it may be of any advantage to the community at large, you are welcome to give it publicity.

I keep about 100 ewes, principally for the benefit of the wool in clothing my negroes, which yield upon an average about three pounds. I raise from 80 to 90 lambs, all of which I sell in Norfolk (except those I keep for my own table) for $3 a piece, and am told that the butcher gets from $1 25 to $1 50 per quarter for them. In order to keep up my stock, I am compelled to purchase ewes, for all descriptions of which I give $1 50 each, some of them of course being very indifferent. I keep them constantly in pastures, a number of them being belled in order to give the alarm when attacked by thieves or dogs. The bell strap should be lengthened in November, on account of the growth of the wool. In December I commence feeding with one gill of corn meal per day, and occasionally cotton seed, which they are very fond of, and salt once a week. I continue this treatment until they have lambs, when I separate them, putting the ewes and lambs in another pasture, and increase their allowance of meal to a half pint, with as many cotton seed as they will eat, or pea hulls and fodder, when I have not the seed to spare. I pursue this course until the pasture affords a sufficient quantity of grass, which is about the 15th of April, when I leave them to shift for themselves, except giving them salt.

JAMES WILSON.

A REMARKABLE CROP OF CORN.

To the Editor of the Farmers' Register.

Nelson Co. Feb. 17, 1835.

A small piece of land in this vicinity was made to produce the last year a crop of corn so unusual in the amount per acre, as to attract much notice in this region, and perhaps to merit being recorded for more public attention. It was grown on an island in James River, about two miles from the mouth of Rockfish. The whole island, it is sup-

posed, may contain 3½ acres. But the portion cultivated was estimated not to exceed three—a part of the upper end having been left in trees and shrubbery to arrest logs and other trash brought down by freshets, which might otherwise injure the crop, and a part left untilled near the water's edge all around. I rode with the manager over the ground and concurred in the opinion expressed by more competent judges who had previously visited it, that the above estimate was not extravagant. The product measured was eighty-one and a half barrels, or over twenty-seven barrels to the acre.

The mode of cultivation as reported by the overseer, was as follows. The ground after being cleared up was laid off in drills four feet apart. A coulter was then drawn to its full depth, backwards and forwards along the direction of these drills, and a single furrow with a two-horse plough was thrown to them on each side. The top of the bed thus formed, was again opened by a coulter, and the corn sowed in March, as thickly as cotton seed usually are. It was twice cut down by frost, and many of the plants pulled up by birds. When thinned, near the parts thus depredated, three and four stalks were left standing together, and the rest left at intervals of four to six inches. As usual here, the coulter was run next the corn after coming up. The balks were broken up with a one-horse plough. It received no cultivation after harvest, and the result was as mentioned. The overseer thinks that much was pillaged by boatmen, and a considerable quantity lost by the weeds, which in many places were as high as the corn—and is confident that with increased care a larger crop may be made from the same land another year.

It is the purpose of the proprietor, Mr. Samuel Jones of Buckingham, to have an accurate survey of the island, so that we may see the exact result. The land is not apparently richer than much in the same neighborhood, and along the river—so that we may legitimately infer that there are many farmers unaware of the capability of their soil.

N. F. CABELL.

REAL NAMES TO COMMUNICATIONS—KEEPING POTATOES.

To the Editor of the Farmers' Register.

King and Queen, 21*st Feb.*, 1835.

I agree most cordially with your Matthews correspondent, Peter De Quir, in his excellent and pointed suggestions as to *fictitious signatures*, except his own most *striking inconsistency*. Now I may have fallen into a mistake as to this matter, but my impression is, that no such name as Peter De Quir is really known in Matthews; if so, is it not unfortunate that we should not have been favored with *all* the reasons for secrecy, while this sensible writer had the subject in hand? For certainly if he had fairly uncovered himself, we should at least have seen him *undisguised!* But, Mr. Editor, I designed to say, that I am perfectly convinced that your Matthews correspondent is right in theory; and that every man should divest himself of all false pretensions, and avoid disguise, in giving either his *opinions* or *practice* upon the great subject of agriculture. Let every man be fairly and fully recognized; whether he shall be found scientific enough to give geological, chemical, or philosophical essays, or only so plain as to be able to say something, as I shall presently, upon so small a topic as *small potatoes*. Your work is designed to do good—it has done, already, great good: but I humbly think, that it may be rendered greatly more beneficial, by the apparently small amendment contemplated by the theory of your friend Peter, which I shall certainly carry out into practice, hoping soon to hear from him again. Suppose, Mr. Editor, you were, as your subscribers are, compelled to receive and peruse some twenty or fifty long letters every month, touching all the various concerns of the contents of one of the numbers of the Register, all under fictitious names, or from anonymous pens. If you could do no better, you might say of it well; but when it is known to be so easy a matter for a different state of things to be accomplished, how are we made to desire to know the name of every man who thus writes to us! And this is no forced supposition. Your contributors are not really writing to *you*, as I appear to be doing now; but are actually writing to *me*, and to all your subscribers. I'll venture to say it, that if you will take the vote of your whole list, that nine-tenths will be with me. But I shall forget the *potatoes*. They shall be forthcoming, however; and what I wish besides, *the best method* that I have tried for preserving them through the winter. I mean Irish potatoes.

After the tops have withered under the influence of the frost, in mild weather let them be dug. Some appear to be more anxious to avoid the appearance and effects of frost, than seems to be important. But for the potato becoming saturated with water, it would remain good, in all probability, through the winter, in the patch. All that I do then, is simply to dig, and carry the crop into a dry cellar, deposite them in a heap as carefully as is convenient, and cover them over about six or eight inches thick with wheat straw; upon which it is well to lay an additional light cover of boards. They thus seem to derive some little moisture from the earth beneath, so as to keep them plump, while the simple covering described, excludes the air and influence of cold.

So much then, Mr. Editor, for fictitious names, and the best method of preserving Irish potatoes. I have no idea of venturing much farther upon the great products of agriculture, because I mean to subscribe my name, and might thereby be brought into disproportionate discredit. Believing that the suggestions of the above plan will be pardoned, if found to be nothing more than an old thing, upon the ground of a desire to do good even in a small way, having often heard difficulties set forth upon the subject, I cheerfully submit it.

J. DU VAL.

[We agree entirely with our correspondent as to the propriety and necessity of the real names of correspondents being affixed to all communications on practical agriculture. This opinion we have repeatedly and strongly expressed—and have only refrained from continuing to urge it, because it seemed useless. We cannot compel correspondents to adopt this course: but of this they may be assured—that by presenting their pieces without responsible signatures, they des-

troy half their value, and prevent their receiving the attention from the public, which they would otherwise command. But the evil is actually worse than our correspondent supposes. Some correspondents, not content with withholding their names from the readers of the Farmers' Register, conceal them from the editor. Nay, this disguise has been affected, where it could have no possible effect in concealing the writer where he was known, and only served to lessen the credit and proper value of the communication, where he was not known. Communications which had been publicly read before an agricultural society, and approved, have been sent for publication without any clue to the authors' names. We take this occasion, however, to say, that communications of this kind, already made public, will not again be published as anonymous. As to other correspondents, if they choose to take away both credit and interest from their communications, by withholding their names—be it so. But it is at least necessary that their names should be made known to the editor: and unless that is done in future, very little respect will be paid to such pieces, or to writers who require to be so closely concealed. And further—if any name sent is not on our subscription list, or otherwise known, it will be supposed to belong to such a "man of straw" as it seems Peter De Quir is suspected to be. Communications signed by real names, will always receive (as they deserve) much more respect and attention from the editor, as well as from all readers, than the same pieces would, without that stamp of responsibility and value.

Since writing the opinions expressed above, a striking illustration of their truth has been received in a private letter from a friend, who is himself one of our most valuable *anonymous* correspondents. He asks, "Who is your correspondent from ——— in No. ———? Are his crops made on *land*, or on *paper*? I should guess the latter." Now if the piece referred to had been signed by the writer's proper name, (which in this case we have, though, as in all such cases, *confidentially*,) probably no such doubt would have existed. Having so stated this inquiry as to give no clue to the true object, we should be very glad if every anonymous correspondent would make the application to his own communication—and particularly that the friend who has made the inquiry, will profit by the lesson which his words indirectly but forcibly convey to others.]

Extract from the Southern Agriculturist.

EXPERIMENT, IN KEEPING SWEET POTATOES.

Charleston S. C., Dec. 23rd, 1834.

It became necessary for me to spend the whole winter together with my family in the city. Having made a fine crop of potatoes, I wished that we should enjoy at least a portion of them, and at the same time, did not feel disposed to purchase what was in such abundance on the plantation. As opportunities would offer but seldom to bring them from thence, I determined to pack some up in barrels, and knowing from sad experience, how rapidly they decayed when thus packed alone, I had a parcel of sand got, and placing a small quantity at the bottom, proceeded to place the potatoes in, packing them as close as possible, and then filling the interstices with sand, as we advanced. The only care taken was that none should be bruised, and that all specked and rotten potatoes should be excluded. When the barrel was filled, we placed about an inch of sand at the top, having first shaken them so as to have every part completely filled with the sand. In this state they were headed up and sent to the city. I do not believe that I had a potato less in the barrels, than if I had not used the sand, for they were placed in first and the sand afterwards thrown in and shaken down. I took no care to have dry sand, but used that which happened to be handy at the place where they were packed, and the most of it was moist. These potatoes lasted us until very late in the spring without sprouting or shriveling, as is always the case when kept late, nor did I loose many by rotting, perhaps not more than half a dozen to the barrel, and this I had every reason to expect, for the potatoes had been harvested several weeks, and in selecting them, the heaps were overhauled. Those which rotted, in all probability, had received some injury or had the seeds of decay, though not obvious at the time.

From the Genesee Farmer.

HARVESTING OF CORN.

Mr. Editor—Some of my opinions respecting the best and most profitable mode of harvesting a crop of corn, were considerably shaken by the communications which appeared in the last volume of the Farmer on this subject, from men whose testimony is of the greatest weight. My impression has been, that to secure the greatest quantity of good sound corn, it was best, as soon as the tops had become somewhat dry, and the ears hard glazed, to top the corn, and let the ears stand on the stalks till the time of gathering, and such of course has generally been my practice. I did this, because I believed that after the top had performed its office of fecundating the plant, it became in a manner useless; and that stalks dry, and leaves withered, however excellent as a fodder for cattle, could do little or nothing towards elaborating the juices necessary for the perfection of the ears. It besides appeared to me that the fresh and green husks which farmers know retain their power of elaborating sap much longer in general than the leaves, were designed by nature to supply the ears with food; and though opposed to the mutilation of plants generally, as the means of increasing their productiveness, topping corn I did not consider as an operation of that kind. When such men, however, as Buel and Coleman, maintain a different theory, and backed by experiment, contend that topping corn is hurtful, it certainly becomes minor agriculturists to pause, and test the question thoroughly. These farmers, and others assert, that topping corn is decidedly injurious—that it materially lessens the actual weight of the crop—and, therefore, that allowing the stalk to remain whole till the time of gathering, or else cutting it up close to the bottom, is the preferable mode of harvesting.

These experiments, though so far as they were detailed, they appeared to be very fairly conducted, were not altogether satisfactory to me, as they did

not go far enough. Every farmer is sensible, that corn topped becomes more thoroughly dried by exposure to the direct rays of the sun, and must therefore be expected to weigh less at the time of gathering than corn shaded by the tops, or cut up by the bottom and standing in stacks till husked. My corn the past year had been cut up by the bottom, with the exception of a few pieces of rows, before the thought of making any experiments myself on the subject occurred. In order to see, however, whether my ideas of the different rate of shrinkage between topped corn, and that cut up, were correct, I carefully weighed a basket full of ears of each kind, at the time of gathering, and placing them in a dry chamber, where they lay undisturbed, let them remain until the middle of January, when I had both kinds carefully shelled and weighed. By this experiment, it appeared that the corn cut up by the bottom shrunk three pounds in a bushel more than the topped; but this did not mark the extent of the difference, as at the time of shelling, the former was easily distinguished from the latter by its comparative dampness, though both parcels were bright, fine corn. I cannot, therefore, consider the question as entirely put at rest by any experiments that have yet been made, but as the matter is certainly one of importance, I hope that another season will not pass without its being done effectually. In order to do this, all the specimens must not only be weighed and measured at the time of gathering and at the time of shelling, but be suffered to remain in some position favorable to the evaporation of all dampness until the corn is completely and thoroughly dried, when a careful comparison of the whole would show the true result.

W. G.

From the Genesee Farmer.

ON SPLITTING FIRE-WOOD.

We have lately examined a quantity of fire-wood, which was cut and corded last winter; and we have become still more strongly impressed with the importance of having *every stick split* that is large enough to receive a stroke of the axe, longitudinally. It not only dries better, but some kinds of wood are rendered by this operation nearly of double value; and we are warranted by our examinations in saying that *hickory* is one of those kinds. Sticks of six or eight inches diameter, which were quartered at that time, are now seasoned, hard and solid; while such as were left to *soak in their sap*, are most miserably worm eaten. The round sticks of bass-wood escaped these depredators, but their value is greatly lessened by incipient decay; and retain too much moisture to be profitably used without kiln-drying. We are persuaded that to split all such wood, and to *let out the sap*, is a most judicious investment of capital.

From the Monthly Magazine.

THE BURYING BEETLE.

A foreign naturalist gives a very interesting account of the industry of this insect. He had often remarked that dead moles, when laid upon the ground, especially if on loose earth, were almost sure to disappear in the course of two or three days, often of twelve hours. To ascertain the cause, he placed a mole upon one of the beds in his garden. It had vanished by the third morning; and on digging where it had been laid, he found it buried to the depth of three inches, and under it four beetles, which seemed to have been the agents in this singular inhumation. Not perceiving any thing particular in the mole, he buried it again; and on examining it at the end of six days, he found it swarming with maggots, apparently the issue of the beetles, which M. Gleditsch now naturally concluded had buried the carcass for the food of their future young. To determine these points more clearly, he put four of these insects into a glass vessel, half filled with earth and properly secured, and, upon the surface of the earth, two frogs. In less than twelve hours, one of the frogs was interred by two of the beetles; the other two ran about the whole day as it busied in measuring the dimensions of the remaining corpse, which on the third day was also found buried. He then introduced a dead linnet. A pair of the beetles were soon engaged upon the bird. They began their operations by pushing out the earth from under the body, so as to form a cavity for its reception; and it was curious to see the efforts which the beetles made, by dragging at the feathers of the bird from below, to pull it into its grave. The male, having driven the female away, continued the work alone for five hours. He lifted up the bird, changed its place, turned it and arranged it in the grave, and from time to time came out of the hole, mounted upon it, and trode it under foot, and then retired below, and pulled it down. At length, apparently wearied with this uninterrupted labor, it came forth, and leaned its head upon the earth beside the bird, without the smallest motion, as if to rest itself, for a full hour, when it again crept under the earth. The next day, in the morning, the bird was an inch and a half under ground, and the trench remained open the whole day, the corpse seeming as if laid out upon a bier, surrounded with a rampart of mould. In the evening, it had sunk half an inch lower, and in another day the work was completed, and the bird covered. M. Gleditsch continued to add other small dead animals, which were all sooner or later buried; and the result of his experiment was, that in fifty days four beetles had interred, in the very small space of earth allotted to them, twelve carcasses; viz. four frogs, three small birds, two fishes, one mole, and two grasshoppers, besides the entrails of a fish, and two morsels of the lungs of an ox. In another experiment, a single beetle buried a mole forty times its own bulk and weight in two days.

From the Library of Useful Knowledge, Farmer's Series.

GENERAL HISTORY OF THE HORSE.

[Concluded from p. 597, Vol. II.]

The English Horse.

The earliest record of the horse in Great Britain is contained in the history given by Julius Cæsar of his invasion of our island. The British army was accompanied by numerous war-chariots, drawn by horses. Short scythes were fastened to the ends of the axletrees, sweeping down every thing before them, and carrying terror and devastation into the ranks of their enemies. The conqueror gives a most animated description of the dexterity with which the horses were managed.

What kind of horse the Britons then possessed,

it would be useless to inquire; but, from the cumbrous structure of the car, and the fury with which it was driven, and from the badness or nonexistence of the roads, they must have been both active and powerful in an extraordinary degree. Cæsar deemed them so valuable, that he carried many of them to Rome; and the British horses were, for a considerable period afterwards, in great request in various parts of the Roman empire.

Horses must at that time have been exceedingly numerous in Britain, for we are told that when the British king, Cassibellanus, dismissed the main body of his army, he retained four thousand of his war-chariots for the purpose of harrassing the Romans, when they attempted to forage.

The British horse now received its first cross; but whether the breed was thereby improved cannot be ascertained. The Romans having established themselves in Britain, found it necessary to send over a numerous body of cavalry to maintain a chain of posts and check the frequent insurrections of the natives. The Roman horses would breed with those of the country, and, to a greater or less extent, change their character; and from this time, the English horse would consist of a compound of the native and those from Gaul, Italy, Spain, and every province from which the Roman cavalry was supplied. Many centuries afterwards passed by, and we have no record of the character or value, improvement or deterioration, of the animal.

It would appear probable, however, that Athelstan, the natural son of Alfred the Great, and the second in succession to him, paid some attention to the improvement of the horse; for having subdued all the rebellious portions of the Heptarchy, he was congratulated on his success by some of the continental princes, and received from Hugh Caper of France, who solicited his sister in marriage, various presents, doubtless of a nature that would be thought most acceptable to him; and among them several German *running horses*. Hence our breed received another cross, and probably an improvement.

Athelstan seems to have seriously devoted himself to this important object, for he soon afterwards decreed (A. D. 930) that no horses should be sent abroad for sale, or on any account, except as royal presents. This proves his anxiety to preserve the breed, and likewise renders it probable that the breed was beginning to be esteemed by our neighbors. In a document bearing date A. D. 1000 we have an interesting account of the relative value of the horse. If a horse was destroyed, or negligently lost, the compensation to be demanded was thirty shillings; a mare or colt, twenty shillings; a mule or young ass, twelve shillings; an ox, thirty pence; a cow, twenty-four pence; a pig, eight pence; and, it strangely follows, a man, one pound.*

In the laws of Howell the Good, Prince of Wales, and passed a little before this time, there are some curious particulars respecting the value and sale of horses. The value of a foal not fourteen days old is fixed at four pence, at one year and a day it is estimated at forty-eight pence; and at three years sixty pence. It was then to be tamed with the bridle, and brought up either as a *palfrey* or a *serving horse;* when its value became one hundred and twenty pence; and that of a *wild* or unbroken mare, sixty pence.

Even in those early days, the frauds of dealers were too notorious, and the following singular regulations were established. The buyer was allowed time to ascertain whether the horse were free from three diseases. He had three nights to prove him for the staggers; three months to prove the soundness of his lungs; and one year to ascertain whether he was infected with glanders. For every blemish discovered after the purchase, one-third of the money was returned, except it should be a blemish of the ears or tail.

The practice of letting horses for hire was then known, and then, as now, the services of the poor hack were too brutally exacted. The benevolent Howell disdains not to legislate for the protection of this abused and valuable servant. "Whoever shall borrow a horse, and rub the hair so as to gall the back, shall pay fourpence; if the skin is forced into the flesh, eight pence; if the flesh be forced to the bone, sixteen pence."

One circumstance deserves to be remarked, that in none of the earliest historical records of the Anglo-Saxons or the Welsh, is there any allusion to the use of the horse for the plough. Until a comparatively recent period, oxen alone were used in England, as in other countries, for this purpose; but about this time (the latter part of the tenth century) some innovation on this point was creeping in, and, therefore, a Welsh law forbids the farmer to plough with horses, mares, or cows, but with oxen alone. On one of the pieces of tapestry woven at Bayonne in the time of William the Conqueror, (A. D. 1066) there is the figure of a man driving a horse attached to a harrow. This is the earliest notice we have of the use of the horse in field labor.

With William the Conqueror came a marked improvement in the British horse. To his superiority in cavalry this prince was chiefly indebted for the victory of Hastings. The favorite charger of William was a Spaniard. His followers, both the barons and the common soldiers, came principally from a country in which agriculture had made more rapid progress than in England. A very considerable portion of the kingdom was divided among these men; and it cannot be doubted that, however unjust was the usurpation of the Norman, England benefited in its husbandry, and particularly in its horses, by the change of masters. Some of the barons, and particularly Roger de Boulogne, earl of Shrewsbury, introduced the Spanish horse, on their newly-acquired estates. The historians of these times, however, principally monks, knowing nothing about horses, give us very little information on the subject.

In the reign of Henry I. (A. D. 1121) the first Arabian horse, or, at least, the first on record, was introduced. Alexander I., king of Scotland, presented to the church of St. Andrew's an Arabian horse, with costly furniture, Turkish armor, many valuable trinkets, and a considerable estate.

Forty years afterwards, in the reign of Henry II., Smithfield was celebrated as a horse-market. Fitz-Stepen, who lived at that time, gives the following animated account of the manner in which the *hackneys* and *charging-steeds* were tried there,

*According to the Anglo-Saxon computation, forty-eight shillings made a pound, equal in silver to about three pounds of our present money, in value to fifteen or sixteen pounds, and five pence made one shilling.

by racing against one another. "When a race is to be run by this sort of horses, and perhaps by others, which also in their kind are strong and fleet, a shout is immediately raised, and the common horses are ordered to withdraw out of the way. Three jockeys, or sometimes only two, as the match is made, prepare themselves for the contest. The horses on their part are not without emulation; they tremble and are impatient, and are continually in motion. At last, the signal once given, they start, devour the course and hurry along with unremitting swiftness. The jockeys inspired with the thought of applause, and the hope of victory, clap spurs to their willing horses, brandish their whips, and cheer them with their cries." This description reminds us of the more lengthened races of the present day, and proves the blood of the English horse, even before the Eastern breed was tried.

Close on this followed the Crusades. The champions of the Cross certainly had it in their power to enrich their native country with some of the choicest specimens of Eastern horses, but they were completely under the influence of superstition and fanaticism, and common sense and usefulness were forgotten.

An old metrical romance, however, records the excellence of two horses belonging to Richard Cœur de Lion, which he purchased at Cyprus, and were therefore, probably, of Eastern origin.

> Yn this worlde they hadde no pere,*
> Dromedary nor destrere,†
> Stede, Rabyte,‡ ne Cammele,
> Goeth none so swifte, without fayle:
> For a thousand pownd of golde,
> Ne should the one be solde.

The war-steed was defended by mail or plate, much on the plan of the harness of the knight himself. His head was ornamented with a crest. The head, chest, and flanks, were wholly or partially protected; and sometimes, he was clad in complete steel, with the arms of his master engraved or embossed on his *bardings*. The bridle of the horse was always as splendid as the circumstances of the knight allowed, and thus a horse was often called Brigliadore, from *briglia d'oro*, a bridle of gold. Bells were a very favorite addition to the equipment of the horse. The old Troupadour, Arnold of Marson, says, that "nothing is so proper to inspire confidence in a knight, and terror in an enemy."

The price of horses at this period was singularly uncertain. In 1185, fifteen breeding mares sold for two pounds twelve shilling and sixpence. They were purchased by the monarch, and distributed among his tenants, and in order to get something by the bargain, he charged them the great sum of four shillings each. Twenty years afterwards, ten capital horses brought no less than twenty pounds each; and, twelve years later, a pair of horses were imported from Lombardy, for which the extravagant price of thirty-eight pounds thirteen shillings and fourpence was given. The usual price of good handsome horses was ten pounds, and the hire of a car or cart, with two horses, was tenpence a-day.

To King John, hateful as he was in all other respects, we are yet much indebted for the attention which he paid to agriculture generally, and particularly to improving the breed of horses. He imported one hundred chosen stallions of the Flanders kind, and thus mainly contributed to prepare our noble species of draught-horses, as unrivalled as the horses of the turf.

John accumulated a very numerous and valuable stud. He was eager to possess himself of every horse of more than usual power; and, at all times, gladly received, from the tenants of the crown, horses of a superior quality, instead of money, for the renewal of grants, or the payment of forfeitures belonging to the crown. It was his pride to render his cavalry, and the horses for the tournament and for pleasure, as perfect as possible. It could not be expected that so haughty a tyrant would concern himself much with the inferior kinds; yet while the superior was becoming rapidly more valuable, the others would, in an indirect manner, partake of the improvement.

One hundred years afterwards, Edward II. purchased thirty Lombardy *war-horses*, and twelve heavy draught-horses. Lombardy, Italy, and Spain were the countries whence the greater part of Europe was then supplied with the most valuable cavalry or parade horses. Horses for agricultural purposes were chiefly procured from Flanders.

Edward III. devoted one thousand marks to the purchase of fifty Spanish horses; and of such importance did he conceive this addition to the English, or rather mingled blood, then existing, that formal application was made to the kings of France and Spain to grant safe conduct to the troop. When they had safely arrived at the royal stud, it was computed that they had cost the monarch no less than thirteen pounds six shillings and eightpence per horse, equal in value to one hundred and sixty pounds of our present money.

This monarch had many *running-horses*. The precise meaning of the term is not, however, clear. It might be light and speedy horses in opposition to the war horse, or those that were literally used for the purpose of racing. The average price of these running-horses was twenty marks, or three pounds six shillings and eightpence. Edward was devoted to the sports of the turf or the field, or he began to see the propriety of crossing our stately and heavy breed with those of a lighter structure and greater speed.

There was, however, one impediment to this, which was not for a very long period removed. The soldier was cased in heavy armor. The knight, with all his accoutrement, often rode more than twenty-five stone. No little bulk and strength were required in the animal destined to carry this back breaking weight. When the musket was substituted for the cross-bow and battle-axe, and this iron defence, cumbrous to the wearer and destructive to the horse, was useless, and laid aside, the improvement of the British horse in reality commenced.

While Edward was thus eager to avail himself of foreigh blood, with the two frequent selfishness of the sportsman, he would let no neighbor share in the advantage. The exportation of horses was forbidden under very heavy penalties. One case in which he relaxed from his severity is mentioned, when he permitted a German merchant to re-export some Flanders horses which he had brought on speculation; but he was strictly forbidden to

*Peer, equal. †War horse. ‡Arabian.

send them to Scotland. Nay, so jealous were these sister-kingdoms of each other's prosperity, that so late as the time of Elizabeth, it was felony to export horses from England to Scotland.

The English horse was advancing, although slowly, to an equality with, or even superiority over those of neighboring countries. His value began to be more generally and highly estimated, and his price rapidly increased—so much so, that breeders and the dealers, then, as now, skilful in imposing on the inexperienced, obtained from many of our young grandees enormous prices for them. This evil magnified to such an extent, that Richard II. (1386) interfered to regulate and determine the price. The proclamation which he issued is interesting not only as proving the increased value of the horse, but showing what were, four hundred and fifty years ago, and what are, still, the chief breeding districts. It was ordered to be published in the counties of Lincoln and Cambridge, and the East and North Ridings of Yorkshire; and the price of the horse was restricted to that which had been determined by former sovereigns. A more enlightened policy has at length banished all such absurd interferences with agriculture and commerce.

We can now collect but little of the history of the horse until the reign of Henry VII., at the close of the fifteenth century. He continued to prohibit the exportation of stallions, but allowed that of mares when more than two years old, and under the value of six shillings and eightpence. This regulation was, however, easily evaded, for if a mare could be found worth more than six shillings and eightpence, she might be freely exported on the payment of that sum.

Henry VIII., a tyrannical and cruel prince, but fond of show and splendor, was very anxious to produce a valuable breed of horses; and the means which he adopted were both perfectly in unison with his arbitrary disposition, and very little calculated to effect his object. He affixed a certain standard, below which no horse should be kept. The lowest height for the stallion was fifteen hands, and for the mare thirteen hands; and even before they had arrived at their full growth, no stallion above two years old, and under fourteen hands and a half, was permitted to run on any forest, moor, or common, where there were mares. At "Michaelmastide" the neighboring magistrates were ordered to "drive" all forests and commons, and not only destroy such stallions, but all "unlikely tits," whether mares or geldings, or foals, which they might deem not calculated to produce a valuable breed. He likewise ordained, that in every deer-park a certain number of mares, in proportion to its size, and each at least thirteen hands high should be kept; and that all his prelates and nobles, and "all those whose wives wore velvet bonnets," should keep stallions for the saddle at least fifteen hands high. These ordinances perished with the tyrant by whom they were promulgated.

The reign of Henry VIII. produced the earliest English treatise on agriculture, and the management of horses and cattle. It was written by Sir A. Fitzherbert, Judge of the Common Pleas, and contains much useful information. It is entitled, "Boke of Husbandry;" and, being now exceedingly rare, an extract from it may not be unacceptable. It would seem that the mare had been but lately employed in husbandry, for he says, "A husbande may not be without horses and mares, and specially if he goe with a horse-ploughe he must have both, his horses to draive; his mares to brynge colts to upholde his stocke, and yet at many times they may draive well if they be well handled." The learned judge shared the common fate of those who have to do with the horse. "Thou grasyer, that mayst fortune to be of myne opinion or condition to love horses, and young coltes and foles to go among thy cattle, take hede that thou be not beguiled as I have been a hundred tymes and more. And first thou shalt knowe that a good horse has 54 properties, that is to say, 2 of a man, 2 of a badger, 4 of a lion, 9 of an oxe, 9 of a hare, 9 of a foxe, 9 of an asse, and 10 of a woman."*

The tyrannical edicts of Henry VIII. had the effect which common sense would have anticipated—the breed of horses was not materially improved, and their numbers were sadly diminished. When the bigot, Philip of Spain, threatened England, in the reign of Elizabeth, with his Invincible Armada, that princess could muster in her whole kingdom only three thousand cavalry to oppose him; and Blundeville, who wrote at this time a very pleasant and excellent book on the art of riding, speaks contemptuously of the qualities of these horses. The secret of improving the breed had not been then discovered; it had been attempted by arbitrary power; and it had extended only to those crosses from which little good could have been expected: or, rather, it had more reference to the actual situation of the country, and the heavy carriages, and the bad roads, and the tedious travelling which then prevailed, than to the wonderful change in these which a few centuries were destined to effect.

Blundeville describes the majority of our horses as consisting of strong, sturdy beasts, fit only for slow draught, and the few of a lighter structure being weak and without bottom. There were, however, some exceptions, for he relates a case of one of these lighter horses travelling eighty miles in a day—a task which in later times has been too often and cruelly exacted from our half-bred nags.

An account has been given of the racing trial of the horses in Smithfield market. Regular races were now established in various parts of England. Meetings of this kind were first held at Chester and Stamford; but there was no acknowledged system as now; and no breed of racing horses. Hunters and hackneys mingled together, and no description of horse was excluded.

There was at first no course marked out for the race, but the contest generally consisted in the

*Later writers have pirated from Sir A.; but have not improved upon him. The following description of the horse is well known. "A good horse should have three qualities of a woman,—a broad breast, round hips, and a long mane;—three of a lion,—countenance, courage, and fire;—three of a bullock,—the eye, the nostril, and joints,—three of a sheep,—the nose, gentleness, and patience;—three of a mule,—strength, constancy, and foot;—three of a deer,—head, legs, and short hair;—three of a wolf;—throat, neck, and hearing;—three of a fox,—ear, tail and trot;—three of a serpent,—memory, sight, and turning;—and three of a hare or cat,—running, walking, and suppleness."

running of *train-cent* across the country, and sometimes the most difficult and dangerous part of the country was selected for the exhibition. Occasionally our present steeple chase was adopted with all its dangers, and more than its present barbarity; for persons were appointed cruelly to flog along the jaded and exhausted horses.

It should, however, be acknowledged that the races of that period were not disgraced by the system of gambling and fraud which seems to have become almost inseparable from the amusements of the turf. The prize was usually a wooden bell adorned with flowers. This was afterwards exchanged for a silver bell, and "given to him who should run the best and farthest on horseback on Shrove Tuesday." Hence the common phrase of "bearing away the bell."

Horse-racing became gradually more cultivated; but it was not until the last year of the reign of James I., that rules were promulgated and generally subscribed to for their regulation. That prince was fond of field sports. He had encouraged, if he did not establish, horse-racing in Scotland, and he brought with him to England his predilection for it; but his races were more often matches against time, or trials of speed and bottom, for absurdly and cruelly long distances. His favorite courses were at Croydon and on Enfield Chase.

Although the Turkish and Barbary horses had been freely used to produce with the English mare the breed which was best suited to this exercise, little improvement had been effected. James, with great judgement, determined to try the Arab breed. Probably, he had not forgotten the story of the Arabian, which had been presented to one of the Scottish churches, five centuries before. He purchased, from a merchant named Markham, a celebrated Arabian horse, for which he gave the extravagant sum of five hundred pounds. Kings, however, like their subjects, are often thwarted and governed by their servants, and the Duke of Newcastle took a dislike to this foreign animal. He wrote a book, and a very good one, on horsemanship, and described this Arabian as a little bony horse, of ordinary shape, setting him down as good for nothing, because, after being regularly trained, he could not race. The opinion of the Duke, probably altogether erroneous, had, for nearly a century, great weight; and the Arabian horse lost its reputation among the English turf-breeders.

A South-Eastern horse was afterwards brought into England, and purchased by James, of Mr. Place, who was afterwards stud-master, or groom to Oliver Cromwell. This beautiful animal was called the White Turk, and his name and that of his keeper will long be remembered. Shortly afterwards appeared the Helmsley Turk, introduced by Villiers, the first duke of Buckingham. He was followed by Fairfax's Morocco Barb. These horses speedily effected a considerable change in the character of our breed, so that Lord Harleigh, one of the old school, complained that the great horse was fast disappearing, and that horses were now bred light and fine for the sake of speed only.

Charles I. ardently pursued this favorite object of English gentlemen, and a little before his rupture with the parliament, established races in Hyde Park, and at Newmarket. The civil wars somewhat suspended the improvement of the breed; yet the advantage which was derived by both parties from a light and active cavalry, sufficiently proved the importance of the change which had been effected; and Cromwell perceiving, with his wonted sagacity, how much these pursuits were connected with the prosperity of the country, had his stud of race-horses.

At the Restoration a new impulse was given to the cultivation of the horse by the inclination of the court to patronize gaiety and dissipation. The races at Newmarket were restored, and as an additional spur to emulation, royal plates were now given at each of the principal courses. Charles II. sent his master of the horse to the Levant, to purchase brood mares and stallions. These were principally Barks and Turks.

From that period to the middle of the last century, the system of improvement was zealously pursued: every variety of Eastern blood was occasionally engrafted on ours, and the superiority of the engrafted, above the very best of the original stock, began to be evident.

Man is rarely satisfied with any degree of perfection in the object on which he has set his heart. The sportsman had now beauty of form, and speed and stoutness, scarcely an approach to which had been observed in the original breed. Still some imagined that this speed and stoutness might possibly be increased; and Mr. Darley, in the latter part of the reign of Queen Anne, had recourse to the discarded and despised Arabian. He had much prejudice to contend with, and it was some time before the Darley Arabian attracted notice. At length the value of his produce began to be recognised, and to him we are greatly indebted for a breed of horses of unequalled beauty, speed and strength.

This last improvement now furnishes all that can be desired: nor is this true only of the thorough-bred or turf-horse; it is, to a very material degree, the case with every description of horse. By a judicious admixture and proportion of blood, we have rendered our hunters, our hackneys, our coach, nay even our cart horses, much stronger, more active, and more enduring, than they were before the introduction of the race-horse.

For the Farmers' Register.

THE EFFECT OF SEVERE FROST ON LAND—HARROWING IN CLOVER SEED.

Fairfax County, February 15th, 1835.

Cold winter is now I trust upon its final retreat to the north; and though we farmers have suffered much in the flesh, mother earth will soon show that it brought "healing in its wings." I could have wished that it had been longer and more unyielding—for I have long remarked, that the earth was fattened and invigorated by long cold winters, and especially when they came with much snow. Heavy floods followed by a hot sun, in all the flat country except that which is sandy, brings on a kind of deadly hide-bound condition, which can only be cured by hard frost. Now is the time for seeding clover, unless the farmer is so attentive to his interest, as to harrow in the seed—in that case, he must wait until the frost leaves the ground. Let him not fear injury to the crop—for independent of the full and perfect insertion of the clover, the wheat will receive a benefit quite equal to the expense of harrowing. Upon light san-

dy land, clover will not take, unless harrowed in. I would recommend the application of one bushel of plaster immediately after the harrow.

JEREMIAH.

THE MODE OF YOKING OXEN IN CUBA.

To the Editor of the Farmers' Register.

Your magazine having this moment met my eye, and approving greatly its object, I beg leave through that channel to make a communication, which I trust will be deemed interesting to the agriculturists of your quarter.

I am myself a planter in the island of Cuba, and an enthusiast as regards improvements which have a tendency to advance the interest of agriculture in general. It is therefore with feelings approaching to horror, that in travelling through all the southern states, (and no doubt the same practice prevails in the northern,) I have observed the oxen, employed in the fields, to be yoked together at the shoulder, and the whole labor of the animal, consequently, to press upon that part, as if it were the most convenient point, and that of the greatest strength; than which nothing can be more foreign to the fact.

The strength of the ox lies in its neck, and the muscles and tendons thereto appertaining—as is well known to every one acquainted with this noble animal—and consequently, the proper place for the yoke is behind the horns, and attached thereto. In this position, the whole strength of the animal is put forth without the least inconvenience, or effort.

This is by no means a new theory; but an old established practice among various nations. The Spaniards have universally adopted it, and I myself have no other method. I have communicated it very generally, wherever I have found the abominable practice prevail of yoking to the fore-shoulder. I should have thought that a bare insinuation of this improvement, (suggested years ago) would have had the effect of an instant adoption in this country—but as I have said, I am still a witness, recently, of the same vile practice wherever I have travelled.

AGRICULTOR.

Washington City.

INQUIRY INTO THE ORIGIN OF HORIZONTAL PLOUGHING.

To the Editor of the Farmers' Register.

Although a constant reader of your journal, in looking over some of the recent numbers a day or two since, I came across an article which by some chance had escaped my notice until then, and which, although it gives an interesting account of a particular district of our state, contains a paragraph which I think should not pass altogether unnoticed. I allude to the communication of "A Furrow Turner," in the Register for October last. Although highly pleased with his graphic description of the properties of the South West Mountain soil, I believe him mistaken with respect to the history of "horizontal ploughing"—certainly so, if we are to infer from his criticism of the passage from *Arator*, that it was not known elsewhere, previously to its introduction in Albemarle. Having heretofore been struck with this passage myself, I was induced to make further inquiry, to learn if no mention was made of this important improvement, or its principle, in the earlier books of husbandry. The search resulted in the conviction, that it was known long ago—that in this, as in so many other things, the ancients have stolen our best thoughts, and left to the moderns, but the credit of adoption and dissemination.

I do not know on what authority *Arator* asserted its existence in Scotland a century since—whether that of Lord Kames or some one else. But a passage or two which I subjoin from Sir John Sinclair will go to show, that this, or something very nearly resembling it, was known there before the present century.

"In regard to steep banks or declivities, there are four modes in which *ridges* may be laid out.

First. When they are planted on the same level. This is done partly with a view of preventing the soil and manure from being washed down, and partly from the idea that it is easier for the cattle to work it. But it keeps up the water in the furrows, and is an awkward mode of ploughing. Sometimes this sort of ridge is carried all around a small hill in a spiral form, beginning at the bottom."

Second. When the ridges are straight up and down. *Third.* When they receive a diagonal direction sloping to the left. *Fourth.* When they slope to the right.

Now, although he condemns the second and third mode, and prefers the fourth, yet his recommendation is succeeded by the following exception:

"Where the land is exceedingly steep, it is often necessary to plough directly *across*, throwing the furrow-slices all down hill, and with the ordinary plough going back empty. But where there is much land of this excessive steepness to cultivate, a plough with a shifting mould-board, usually called a *turnwrest* plough, admits of ploughing both backwards and forwards, shifting the mould-board in such a manner as always to throw the furrow-slice down the hill."—*Systems of Husbandry*, Vol. I. pp. 168, 170.

In the first volume of *The General Report of Scotland*, drawn up under the direction of the same author, we find at pp. 351, 352, substantially the same remarks.

But perhaps Sir John may have written rather too near to our time to render it altogether certain that his countrymen did not adopt it from ours without acknowledgement.

Well then, let us come down to England. In *Forbes' Agriculture*, written somewhere about 1778, we meet with this passage at page 638 in the description of an agricultural implement:—

"This is a turnwrist, or turnrest, and by some called a turn-ridge plough. It turns the furrows all one way, laying the land level, without ridges or parting furrows; and in sideling or sloping grounds, where the descent is too great for the cattle to draw the plough up and down the side of a hill, and too steep to turn the furrows up against it, this plough performs the tillage very well, the cattle drawing it *across the descent*, it turns the furrows downwards, or with the descent. It differs from the swing-plough in the mould-boards, which in this plough are *double and moveable*."

From this, it appears that the hill-side plough at least, is no novelty. In a still earlier work, *A New System of Agriculture, &c.*, a small duo-

decimo by an anonymous author, published in 1755, the following remarks occur:

"I can't introduce a very useful observation in a more proper place than this; and that is, when the land you are to plough is the side of a very steep hill, as it often is, 'tis down-right madness to proceed, as most countrymen do, by ploughing directly up and down the steep. In this case, 'tis pity the driver is not in the place of his team; he would then, perhaps, discover that 'twould be the wisest way to plough *across the hill*, by which means the cattle would not only draw with the same ease as if they worked on plain ground, but the furrows lying athwart would prevent the rains from washing down the fatness of the soil with every flood—a misfortune to which at present they are yearly liable, and often ruined and empoverished by it."

I cannot but think that a person familiar with the improved, as contrasted with the up-and-down mode, if he had never heard mooted the question of its origin, would in the above passages, recognize his old acquaintance. Possibly, however, there may be yet room for doubt or objection, as we have here only ambiguous terms. Ploughing "across" or "athwart" a hill may not stand precisely for ploughing "horizontally." It may mean ploughing in a straight line, without reference to inequalities. Be it so. Let the furrow proceed straight across, climbing the swells and jumping the ravines, till it reaches the other side of the field; (though this interpretation will scarce hold water more than the furrow it represents,) or let it ramble like a sheep—(though a sheep walk on a hill-side is not so badly graduated after all—) still let us see if we can find no evidence less equivocal. What says the great father of modern husbandry? We present an extract from his "Chapter on Ridges."

After urging the importance of laying dry the soil on the hill-sides, (which in England are very liable to be saturated with water,) he speaks of two modes of effecting the object. First, by *covered* horizontal trenches, which he objects to as expensive and yet not permanent; and then suggests that—"'tis a better method to plough the ridges across the hill almost *horizontally*, *(ma foi!* here's the very word)—that their parting furrows lying open, may each serve as a drain to the ridge next below it; for when the plough has made the bottom of their horizontal furrows a few inches deeper than the surface of the clay, the water will run to their ends very securely, without rising into the mould, provided no part of the furrows be lower than their ends.

"These parting furrows and their ridges must be made more or less oblique according to the form and declivity of the hill; but the more *horizontal* they are, the sooner the rain-water will run off the lands; for in that case it will run to the furrows, and reach them at right angles, which it will not do when the ridges (or lands) are oblique; and therefore the waters' course across the land will be longer. Every one of these *horizontal trenches* receives all the water from the rills, or little gutters wherein the water runs betwixt the mould and the clay. These are all cut off by the trenches which receive the water at their upper sides, and carry it away, as the trunks of lead placed under the eaves of a house do carry away the rain-water." *Tull's Husbandry*, p. 243.

In a note to this passage he says, "The natural course of water being downwards, it would always run by the nearest way to the bottom of the hill, if nothing stopt it. But the water runs from the hill in two manners; viz. upon the surface of the staple, and upon the surface of the clay that is under the staple; that which runs under, keeps its straight course from the top to the bottom of a hill, under a ridge that is made exactly with the descent of the hill, except that part of the water that rises up into the mould and a very little that soaks into the furrows; for when the furrows are not made exactly with the descent, the more oblique they are to the descent, the longer will be the water's course under the ridges, and the shorter, as they are nearer being at right angles to the descent. 'Tis also the same with the water that falls upon the surface of the ridges; for the more horizontal they are, the shorter its course will be from them to the furrows, which carry it off; and the less of the water will sink into the ridges, the less oblique and the nearer to right angles to the descent they are made."

Here we have the whole *rationale* of this improvement. A little after, he says, "Many hundred acres of good ground are spoiled, and many a good horse, in ploughing against the hill, and against all reason, demonstration, and experience too."

If asked to ascend still higher for evidence, we might call old Columella into court. "In ploughing," he tells us, "it must be especially observed, that the furrow be always drawn *across* the hill; for, by this method the difficulty arising from the acclivity of the ground is surmounted and broken, and the labor both of men and cattle is commodiously lessened."—Book II. Chap. IV.

This may suffice, although additional testimony might be cited from Darwin's *Phytologia* and the *Complete Farmer*, and perhaps others.

Now, is it possible to believe that Gov. Randolph, with the multifarious learning of which he enjoyed the reputation, had never read any of the above works?

The truth, I take it, is about this. England and the United States are essentially different in many of their respective agricultural circumstances, products and wants. England is a foggy, dripping country—where showers are frequent, but rarely so violent as with us. Here, we have frequent storms and torrents. Again, the soil of England is particularly adapted to grass, and being filled with vegetable fibres, is little disposed to wash. I need not say how differently we in the south are situated. There, they have no crop like our maize, set in ridges wide apart, with the plants separated in those ridges—and the broad interval constantly stripped of foreign growth; but their drill crops are either roots or pulse, which lying close together, help to prevent the bursting of the beds by the force of the water. Their object then in making the horizontal beds, is rather to drain the steeps by tapping the oozes and drawing the water into the furrows: ours, rather the preservation of the soil, and the retention of all requisite moisture, while that which is superfluous is suffered to flow off.

To Gov. Randolph then, be the praise of its *introduction* and *adaptation* to our peculiar circumstances. Title enough this, to our lasting gratitude. But let us not be putting "daw's feather" on the dead, lest some future critic, more uncere-

monious than a Virginian from state-pride would naturally be, should endeavor to strip him even of his own proper plumage.

A case-hunter is not always a good lawyer—so you must not conclude from this "bristling of inverted commas" that I am therefore, a *learned*

FARMER.

REPLY TO J. M. G. ON PUTRESCENT MANURES.

To the Editor of the Farmers' Register.

March 10th, 1835.

When my confessedly crude ideas on putrescent manures were submitted to the consideration of the readers of the Farmers' Register, [No. 8, page 497,] I expressed the wish that others would join in the discussion, and bring their aid to correct errors, or to diffuse light. This wish was uttered in good faith: and therefore it was with pleasure that I saw that another writer had come forward—and still more so, that it was one whose signature had often been seen attached to communications in which I always found something either interesting or instructive. My anticipations of deriving both profit and pleasure from his views of this subject, were not disturbed by the strictures which his prefatory remarks promised to myself—and I was prepared to receive my rightful share of correction and reproof, without flinching or complaining, even though applied as sharply as J. M. G's. keen sense of the ridiculous, and talent for satire, so well qualified him to inflict. In his treatment of the general subject, I found some interesting views, and still more valuable facts, which I will advert to hereafter: but in his treatment of my communication, I was both disappointed and surprised, that J. M. G. should have made strictures at such length, and yet have directed them exclusively against mere words and phrases—passages, which are so unimportant to the general tenor of the arguments and statements, that every one assailed might be yielded to his mercy, or to be dealt with at discretion, without the substance or matter of my views being affected by the loss. But personally, I have no cause to regret the adoption of this course. The applause which he has lavished on my communication in general, is much beyond its due, and is certainly a most abundant offset (if any was required) for his fierce attack upon a few words, so unimportant as scarcely to be worth a defence. Nor would I defend them, but for the respect, which in common with so many of your readers, I entertain for the signature of J. M. G. I therefore hope to be excused for occupying so much space, with matters so little deserving notice, upon the ground that the subjects of controversy are not of my choosing, and that I shall act strictly in self defence. I feel no temptation to exceed these limits, nor to use the liberty offered by J. M. G. of treating his arguments in the manner which he has thought proper to adopt. I agree fully with him in condemning the vitiated public taste, which has been "spiced" with personal controversies, until it palls upon, and rejects mere argument and search for truth: but I differ from him entirely as to the propriety of that vitiated appetite being ministered to, by those who desire its cure—and above all, in an agricultural or scientific journal. I proceed to consider the objections of J. M. G. in their order.

"The first of his assertions," says J. M. G. "(page 640) "from which I must dissent, is that "which he has italicised, or thrown into the form "of an antithetical axiom. Since he seems to "design it as a kind of corner-stone to much of "his superstructure, it merits particular examina-"tion. '*Facts*,' (says he,) '*the causes of which* "*are not understood, are not truths, and serve only* "*to mislead us.*' " That this position is neither literally nor universally true, my opponent then shows at length, and most satisfactorily and triumphantly, and uses both the force of logic and of ridicule, to demolish this unlucky little sentence. *Unlucky* not more for its writer than for its critic, for it is here *mis-quoted*—inadvertently, I am very sure—but yet thereby so changed, as to make his ground of objection, and the force of his syllogism much the stronger. He has changed "facts misunderstood" to facts "not understood"—and between *not understanding*, and *misunderstanding* operations and causes, there certainly may be great differences. Correct this mistake, and though the sentence may still be very faulty, yet so much of the point of J. M. G's. syllogisms would be lost, that it may be safely inferred, that he erected them upon his mistake. But even after correcting this error, I am ready to admit, that the intended meaning of this sentence, (if taken alone) was not so fully expressed—so guarded with exceptions and provisoes, as to be safe from cavil, or even free from solid objections—though if taken in connexion with the paragraph of which it forms a part, its intended meaning could scarcely be misunderstood. It was not deemed necessary to be thus guarded at all points, because the sentence was a sort of condensation or abridgement of the purport of the preceding sentences, and is explained by them. The mind of the reader, would scarcely fail to supply its imperfect form and sense, what will be here placed in brackets: "Facts, the causes [or mode of operation] of which are misunderstood, are not truths, and [often] serve only to mislead us." * In this sense, obvious I I think, (except to hyper-criticism's microscopic eye,) I am as ready to defend the truth of the expression, as to admit its unimportance and uselessness.

If any illustration is wanting of the meaning and truth of the passage in question, it is presented (and on this very subject of manures) in your remarks, Mr. Editor, on the piece which preceded mine. You have there shown (page 497) that the mixture of quicklime with putrescent manures, serves to hasten, and may increase greatly the early effects of the latter. Those who have known this "fact" by experience, but who "misunderstood" the cause of this early increase, would naturally be led by it to a false conclusion, and to found a practice thereon altogether wrong and unprofitable. To such misunderstanding the fact was not a *truth*, but served to lead to dangerous error. But he who has learned the cause of this fact, will not take it as a guide to follow, but as a warning to avoid that practice, which to others

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*The reader who may refer to the passage (page 498) is requested to correct a typographical error—instead of "*carry the result*," it was written "vary the result."

would serve, undoubtedly, both profitable and correct.

But J. M. G. was not content to overthrow this sentence in its admitted weakness: he gives it first a factitious importance, of which I had no thought, by calling it more than once an "axiom," as if I had dignified it with that term, and speaks of it "as designed as a kind of corner-stone for much of my superstructure." So far from this being the case, nothing whatever rests upon this "corner-stone"--and if it had been used to erect conclusions on, it would only have been necessary for him to point out the connexion, after having kicked away the corner-stone, and let the whole superstructure tumble. An axiom is a self-evident proposition, so simple as not to require, and scarcely to admit of proof: and if I had maintained that the truth of this condemned assertion was as evident as that "a part is less than the whole," (which would have been necessarily implied in declaring it an axiom,) then my opponent might indeed have had good ground to denounce and deride so absurd a position. But though neither of these grounds assumed by J. M. G. can be maintained, I am content to yield what *may* be made good, viz: that the sentence in question was not expressed clearly, nor in the best manner—nor as deliberately weighed as an important matter would have been, before being uttered—and that indeed it is worthless, and has served no purpose whatever, except as a supposititious "corner-stone" for J. M. G's. syllogisms, and to produce all this "much ado about nothing." In fine, I heartily repent me of my two lines, and again ask the reader's pardon for having preached so long upon a text of so little worth.

The second objection urged by J. M. G. is to the following passage (p. 501.) "Raw meat and "vegetables contain more nutritive matter for the "human stomach than after the loss necessarily "sustained by their being cooked; yet the remainder, after this process, is [better] fitted for the "sustenance of man, and therefore is more valuable than the whole was before the change, and "the waste caused by cooking." This, (whether right or wrong,) was stated merely as an illustration of the undoubted fact then under consideration: and the main force of argument is brought by J. M. G. to bear, not on the proposition as to the necessary preparation of manures, but upon the illustration—leaving the substance to pursue the shadow. J. M. G. needs not to be informed that an undoubted truth may be attempted to be sustained by mistaken facts, and therefore false evidence—and that the exposure of such evidence, does not serve to overthrow, or weaken, the proposition, from whose support it is taken away. As there is the most abundant proof that the far greater proportion of all vegetable matters must in some way or other, pass through the fermentative process, (and not the less so on J. M. G's. plan, than on any other,) to be prepared to act as food for plants, I might, as before, yield the illustration used, as not at all wanting to sustain the position. I readily confess that my knowledge of animal physiology, as of logic, is almost nothing, and I should neither be ashamed, nor unwilling to be corrected in any erroneous views, entertained and expressed because they were supposed to be undoubted truths. But neither does this confession, nor my high sense of respect for my critic, require me to yield the opinion that cooked food is more suited to the digestive powers of man, than raw meat, vegetables, or grain. Such rare cases as he mentions as contradictions to my assertions, even if not "misunderstood," (and therefore presenting what I have called false facts,) would simply be exceptions to the general laws of digestion, which every man knows from his own observation and experience, admit of numerous exceptions and violations. Yielding to J. M. G. that Nebuchadnezzar ate grass for several years without damage—that gourmands may not seem to lose fat by eating beef so raw that the blood follows the knife—that most stomachs (not *all* however) can, without apparent injury, admit raw salads as a small part of their food—and that Dr. Beaumont's wounded soldier actually digested raw cabbage with uncommon ease and rapidity—all these, and a thousand such facts would not overthrow my very unimportant assumption (that is, unimportant to the discussion of the operation of manures,) that cooked food is better suited to sustain man, than raw.

But even if the many striking and notorious exceptions did not exist to the digestive powers of the human stomach, the facts adduced by J. M. G. could have no weight, unless raw food was used altogether by the individuals brought forward—and of this there is no case, excepting the first one named. In all others that are adduced by J. M. G., and in all that can be adduced in the history of men who have made even a single advance above a brutish state, the use of cooked food is the general habit of every individual, and that of raw food, form only partial and very limited exceptions. To give his argument any weight as to any modern and well known examples, enough persons must be confined altogether to raw food, to be compared with, and to prove its being as nourishing as if cooked. The case of Nebuchadnezzar is certainly a strong support to J. M. G's. argument. He did not eat "raw vegetables" only, which might be considered as roots and salads—but "he did eat grass like oxen," as is thrice stated in holy writ. But a miraculous and special exercise of God's just, but temporary vengeance on offenders, is surely altogether unfit to be cited as an example of the ordinary course of the laws of nature. If Nebuchadnezzar's experience is a fair proof that grass, or even raw food of any kind, is equally nutritious for man as cooked food, it would be an equally admissible and sound argument, to prove by the case of Jonah, that all chemists are mistaken in supposing that man's life cannot be long sustained without some change of air in breathing. But I will contend no farther—and willingly leave the decision of this question to the opinions of either the learned in physiology, or of those as plain and ignorant as myself.

"The last of J. B's. assertions," says J. M. G. "against which I beg leave to enter my dissent, "is that wherein he speaks of the coarse manure "of our farm-pens, composed, in great part, of "corn stalks. Of this he says, among other as-"sertions, that 'every corn-stalk serves as a flue "or chimney, to carry off the gases which are "evolved.' Now, unless there are such things as "flues and chimneys stopped at both ends, which "can still carry off such subtle vapors as gases—"or corn-stalks without joints, of which I have "never yet heard—this last assumption is equally

"untenable with the others which I have taken "the liberty to examine. Even admitting that "every corn-stalk was a firm, hollow tube from "end to end, before it could act as 'a flue or chim-"ney,' one end at least must be higher than the "other, and the lower end not stopped up with "earth, (as it must be, if below the earth,) but "*open*, and sufficiently near the ground for the at-"mosphere to force into it whatever is expected to "pass upwards through it."

Now, if every term of comparison or phrase, is to be so measured, and adjusted with mathematical precision to suit the ideas intended to be conveyed, J. M. G. might have named yet stronger objections to my comparing the corn-stalk to a chimney, and might have denied the correctness of the comparison, because the corn-stalk does not have the various parts essential to a chimney, of "vent," "throat," "flue," "shaft," &c., as described by a writer in your March number. If all J. M. G's. sentences and assertions were tried by his own standard of precision, many would be found as incomplete, and as liable to such objections as mine: and if he will take care to avoid liability to be visited by this kind of word-catching criticism, he must entirely abandon his usual flowing and happy manner of expression, and adopt instead, the style of the statute book—studding and entangling his periods with all the exceptions and provisoes that can be thought of—or take as a serious model, the parentheses within parentheses, presented in Gen. Charles Lee's amusing letter concerning his leather breeches.

My saying "flue or chimney," I supposed would plainly enough indicate a passage by which any aeriform fluid could escape, if evolved in contact with one end, and the other end was either out of the earth or less deeply covered by the plough. But this agency is denied to the corn-stalks unless each was a "hollow tube." To the force of this objection I must "beg leave to dissent." The allusion made was not to unbroken stalks, but to the unrotted stalks after having been trodden by cattle—in which state there are not many that have escaped being mashed, and numerous artificial cracks thereby made along the greater part, or whole of their course, through which any fluid might escape, and much more easily a highly elastic and compressed gas. But admitting all that is improperly claimed for the solidity and impenetrability of corn-stalks buried by the plough as manure—even supposing each to be as solid and close as glass or metallic rods, similarly placed—still the loose mould could not so enclose them as not to leave channels or flues for the easy passage of air along the outside of the stalks; and wherever a stalk protruded from the soil, or came very near the surface, an outlet would be offered—and even if the stalk was lying horizontally, such a channel, of four or five feet in length, would certainly communicate with some fissure leading to the surface. These effects might well take place without one end of the flue being higher than the other, and notwithstanding the closest possible stopping of the ends of the stalks by loose mould.

Only these three objections, which have been considered, are named by J. M. G. as "what appear to be the faults of J. B's. communication"—and whether I have succeeded in removing them, or that they remain in full force, I may venture to assert, and call on your readers to witness, that there has yet appeared no material or important difference in our opinions—and our controversy might serve as an example of what slight differences of opinion on unimportant points, may lead to dispute, and to angry dispute, if both parties are not as willing to bear and forbear, as I believe that my highly respected opponent is, and as I am sure of for myself.

For the balance of J. M. G's. communication I have only to repeat my acknowledgements for his praises, with which I have ample cause to be content—and to correct some misapprehension of my meaning into which he seems to have fallen. When he proceeds to express his own opinions, on the action of manures, and to discuss *things* instead of weighing mere *words*, the subject becomes more worthy of his pen—and every reader, as well as myself, will find more pleasure in accompanying him through his argument, whether the opinions expressed, may be approved or not. It is solely with the view of aiding the discussion, and removing some mistakes of my own expressions, that I proceed with this communication, and with my quotations—and not because I have the slightest personal objection to any of the expressions on which I may comment. Nor is it deemed necessary to reply to various jeers and flouts, which are afterwards made to apply to some of the three objections already answered.

J. M. G. seems to have considered me as the advocate for the universal practice of fermenting winter-made manure in heaps. I certainly incline to the opinion, that in most cases such would be the preferable course, *provided every known means is used to guard against waste as much as possible.* That such waste occurs—and under the usual bad management to an enormous extent—both my former communications testify strongly—and not only from theory, but also from experiment. It is not a question between fermenting and not fermenting manure, (as it is often held to be)—but between fermenting in heaps—in the farm-yard without heaping—or after being applied to the fields. Act as you please, fermentation must take place—and until it does take place, far the greater part of the manure must remain insoluble, inert, and possibly injurious. That mode of using manure will be the best which will permit the least waste of the results of fermentation, and of course offer the most to the use of growing plants. I am not altogether opposed to the hypothesis of J. M. G., that the earth attracts and retains these results; but my belief goes only to a certain extent—and that falls far short of all the products of fermentation from a heavy coat of manure—or even from a lighter dressing on soils badly constituted to retain manures. Surely J. M. G. has had experience of the escape and loss (in some way) of so large a part of certain heavy dressings of manure, as to leave little, if any clear profit, from what was saved. Indeed, his own report of the striking and valuable experiment of summer cow-pens ploughed, and proving greatly inferior to others equally manured and not ploughed, is, enough to show that the earth cannot retain these products of fermentation. I referred particularly to general facts of like kind, (page 502) and gave sufficient reasons, deduced from the theory of fermentation, why cow-pens ploughed in summer should lose more of their manure than when not ploughed. The reasoning was satisfactory to my

mind. J. M. G. does not notice this—nor does he attempt to reconcile the admitted waste of fertilizing principles which occurs, with his hypothesis of the earth having power to attract and combine with all the products of fermentation. He says elsewhere,and very truly, that no covering can confine the expansive forces of gases. I readily agree, that if suddenly evolved, and in quantity, they would scarcely require my "flues" for their passage to the upper air—and that his "elective attraction" of the soil would as little serve to retain their entire volume. But growing plants would probably take up the earlier products of fermentation, so as not to permit them to reach the gaseous state—and even a very slow product of gas might be retained in the soil either by mechanical or chemical means, until the growing plants could use it as food. But without growing plants—and especially in case of summer cow-pens—the retentive power of the earth would not suffice for but a small part of the manure ploughed in. On this subject, I beg leave to refer J. M. G. to my previous explanation of such facts, in the piece on which he has commented, (and his own cases present by far the strongest and most satisfactory examples,) and to examine whether my theory of the loss of manure is not more accordant with his facts, than his own view of the attracting and retentive power of soil.

In agreeing with J. M. G. to the power of soil to attract and combine with (not the whole but) a certain amount of the matters left on, or ploughed under its surface, I must remark that I do not arrive at that conclusion by the same course of reasoning with himself. This however is enough to say—for it is not my object, nor wish, in this reply to assail his positions, but merely to defend my own. It is proper, however, that I should state something of my reasons for the waste of fertilizing principles, even in the manuring processes of nature, the deposite of leaves, and other vegetable matters left to rot on the earth. J. M. G. correctly traces the process of nature in restoring lost fertility to the earth, to that limit where I suppose that process to end, and that waste to begin, which he absolutely denies, and the belief in which he treats with ridicule. If my opponent resides in, or near, Lower Virginia, I presume that he either owns, or is acquainted with some bodies of virgin wood land, which are too poor to be worth clearing or cultivating. If he does not know such land, many of your readers certainly do. On the poorest of this wood land, the leaves have been falling and rotting for 4000 years at least—and nothing has been taken by man or beast from the land, except scanty and rare crops of acorns, by the hogs. Now according to J. M. G's. theory of the manuring process of nature—and the impossibility of any of her gifts being lost by natural means, (which he treats more as a question of morals than of chemistry,) I should suppose that the inevitable result would be, that this land would be as rich as the Mississippi bottoms—or at least as rich as it is possible for dry land to be made by putrescent manures—and as this is directly contrary to the known facts, I should be glad to learn how the facts and his theory can be reconciled. I do not treat of the earth and atmosphere as "sentient and moral things," nor do I decide by the measure of the moral wrong—or by the enormity of thus preferring against nature a "slanderous charge of grand or petty larceny" committed on the earth. I simply refer to these facts, of the annual additions for countless ages of fertilizing matter, and that scarcely enough has been fixed in the soil to redeem it from sterility.

There is another point from which I infer (though perhaps incorrectly) that J. M. G. thinks our views opposed, viz: as to the propriety of applying manure to the surface. Though my experience of this mode of application to land under tillage has not been altogether satisfactory, there is nothing in the practice opposed to, and much in support of, my theoretical views formerly stated. This certainly would appear from the reasoning offered as to the ploughing of summer cow-pens—and the consideration of surface manuring from the farm-yard was not there considered, because, though written out, my continuation of the subject was postponed for a future time, and to wait for the views of others to be presented. I will merely here observe, that I most decidedly approve, by experience, of applying rotted manures on the surface of wheat in the winter and spring, and of unrotted manure to clover intended not to be grazed or mown.

The experiment stated by J. M. G. on this subject, (of unrotted manure applied on the surface) is more interesting and decisive than any that I could have offered, and it is gratifying that this discussion has added that to the valuable facts on this subject. If the propriety and economy of surface manuring can be established in all cases, it will certainly serve to remove much the greater part of the fears and the known waste from the fermentation of manures. For though the fermentation on the surface (soon or late) is as certain to occur, as below, or in the dung-hill—still it would be slow, and its first soluble products would be washed into the earth nearly as fast as formed, and used immediately, if growing plants were present.

J. B.

For the Farmers' Register.

MEMORANDA OF THE LAST WHEAT SEEDING.

A long periodical absence in the autumn, and occasional absence at other times of the year, prevent my keeping a regular journal, as do some of my more systematic friends. The plan which I have adopted does not secure all the advantages which that presents, but it does secure some of them; and is convenient on the score of reference. I have a note book in which I make occasional memoranda of the most interesting operations—the amount of crop produced and sold, and other statistics of the farm; together with such reflections as may offer from time to time. The different subjects are entered in detached paragraphs, and the heads are put opposite in marginal columns ruled on the left of each page. By passing the eye hastily down these columns, the subject sought is easily found.

For the perusal of young farmers, among whom I am sorry I cannot *now* number myself, I give you, along with other matter, the substance of a few notes relative to the *late* rather difficult seed-time—late in more senses than one, and not a little difficult in this neighborhood, to those at least who had much low and moist ground, as was my case. In the middle country, on the contrary, I

understand the season has been favorable. The retrospect will, I trust, not be entirely useless. I shall state what I did right, and what wrong, that the former may be imitated, and the latter shunned. And here permit me to remark, that farmers cannot always regulate their management by any set formula, but must vary it according to the varying seasons and circumstances. A friend of mine, residing on the Pamunkey, has this year sown his large crop of eight hundred bushels of wheat, in the month of October. His corn having been destroyed by inundation, the land was replanted and worked late. It was of course clean and loose; and by passing a heavy harrow once on a corn ridge before sowing, and several times afterwards, and then opening the furrows between the beds, the wheat was expeditiously, and I do not doubt effectually, gotten in. Were this attempted in ordinary seasons, when, owing to the early laying by of the corn, the land might have become consolidated, and a considerable growth of grass have ensued, a failure of the wheat crop would be the probable consequence. I refer to this by way of illustration.

I returned home on the 10th of October, after an absence of nearly two months. The weather had been exceedingly wet from the 1st of September. The fodder was all more or less injured, and even at that late period, not all gathered—the corn fields were covered in the rich places with luxuriant grass, and in the low places soaked with moisture, not likely soon to evaporate under the heavy vegetable coat. At seed time my corn fields are usually very clean; but truth requires it to be stated that, owing to the small quantity of hoe work I bestow, they are not particularly so at any other time, except at planting—when I give them the best preparation possible, and take care to have them deeply and thoroughly broken, to which, and the improvement of the soil to the utmost extent of my means, is to be ascribed my modicum of success as a corn grower. But I am sowing wheat and not making corn: that subject I will more fully treat of in a future number. On my arrival, I immediately caused the hands to desist from gathering the tattered and sapless corn blades, and commenced my preparation for sowing, already too long delayed. I have generally found my fallows, when sown very early, more liable to the depredations of the fly; and for that reason, as well as to give a better chance to the corn ground, always more or less exhausted by the previous crop, I commonly begin with it: and having in the mode described in a former number of the Register, (Vol. I. p. 577) detached the bottoms, I sow them first, when practicable. This year it was not so, and I therefore began on the high land. The shock beds were sown and harrowed before the corn was set up on them, to avoid the necessity of harrowing around the shocks. These shock beds are more or less distant from each other, according to the heaviness of the crop, usually 40 corn rows apart; and two or three are always prepared ahead to receive the corn. In all my operations I endeavor to expand the work, so as not to have the hands and teams crowded, but at the same time to keep them sufficiently together for supervision. It may not be amiss here to observe, that after sowing, in hauling off the corn to house it, the carters are directed to run one wheel exactly in the water-furrow, so as to cut up as little wheat as possible. If the corn is luxuriant, and time permits, the stalk is commonly cut off at the ground with one stroke of the hoe, and the stubble divided in two at another.

On the 17th of October, thinking the bottoms dry enough to venture, we commenced on them, but had soon afterwards a Sabbath day's rain, not so restricted in quantity as a Sabbath day's journey in length, which long put these places, and for a day or two, all other places, out of condition. This interval was employed in gathering the corn on two twenty acre lots, in which, and some neighboring pasture ground, the work oxen were turned with great advantage. Being afraid that I should not get all the wheat sown in good time, I resolved to turn my attention to the fallowed land, as soon as I supposed the ground was in order. A part of it had been broken up with three-horse, but much the larger part with four-horse ploughs, which left wide and deep finishing furrows. In the softer and cleaner places, I found it practicable to get the wheat in with some stout harrows, the plan of which I received from a very judicious farmer in Fauquier. They are heavy implements, and only of occasional use in this part of the country, in preparing the most rugged land, and in putting in small grain on fallows. Then followed the seedsmen, and were in turn succeeded by the linked harrows,* each going once in a place, and lapping well. Finding that too many of the grains skipped into the wide and deep water-furrows, I passed a large triangular harrow once before sowing, immediately over the furrows, which loosened the edges of the beds, and intercepted the grain in its downward progress. On the wheat coming up, the borders of the beds not so served, were found much thinner than the rest, though as the evil was soon discovered, not many beds were in this situation. Farther experience showed that the X ploughs,† under the pressure of heavy weights, and drawn by two horses, first on one side and then the other of the furrows, would have answered still better. The beds in most of the land under consideration, are sixteen feet wide. Three bouts of the Fauquier harrows were necessary to finish them. There being, however, a deficiency of those implements, and finding that by running the double-shovel ploughs once exactly on the crowns of the beds, two bouts would suffice, we thenceforth pursued that plan. Subsequent observation convinced me that here too the X ploughs would have been a good substitute, the shovels *drilling* the wheat too much, at a single operation. The wheat on the edges of the beds previously loosened by the triangular harrow, was sufficiently covered by the linked harrows, and by the earth thrown out by the water-furrow plough. On most of the fallowed land besides, the wheat was ploughed in with the double-shovels, which were run just so near the water-furrows as not to cast the earth into them. The edges of the beds were prepared and the seed on them covered in the

* These are light square harrows, two of which are linked, so as to run the one nearly after the other. Each has twenty straight teeth.—Ed.

† This is a kind of cultivator, the wooden frame in which the five small hoes are inserted, being crossed in the form of the letter X.—Ed.

manner before mentioned. Fearing that some of the hardest of the land that was shovelled had not been sufficiently broken by them, I placed heavy weights on the X ploughs, and went over it again, the light harrows following and smoothing it nicely. With this double operation I was entirely satisfied: it was effected in less time than it could have been with the single ploughs. On a small portion of the fallowed land (the hardest and foulest) thinking a turning-plough necessary, I put in the wheat with one-horse, and in a very few cases, with two-horse ploughs: but here the work went slowly on. Luckily there was but little so to be done. By thus adapting the implements to the nature and preparation of the land, great despatch was obtained. The whole operation was completed by opening the cross drains and chopping over, where necessary, with the hoes.

Some time having now elapsed, I determined to return to the bottoms in the corn field; intending to plough and grip the wetter spots, and let them lie unsown until in good, or at least in better order. This was partially, and I regret not more extensively done, as I was tempted, much to my regret afterwards, to sow some too wet, from an apprehension of rain; though no one can be more sensible than I am of the impropriety of cultivating land on the principles of brick-making. At this advanced season, land ploughed and gripped, and left exposed to the action of the sun and air, will dry more in one day, than in many days if allowed to lie unbroken under a thick coat of grass. I would, however, only recommend it late in the fall, when time becomes precious, and the ground is not likely, if let alone, to get in order, nor so apt to bake. By lying thus, previously to being sown, the loose earth on the surface dries and forms a warm and friable bed for the reception of the seed. I wish it however to be understood, that this is only proposed as a resort in case of necessity. If the sun has power enough to dry the earth without such aid, it will certainly be preferable to let it lie undisturbed.

The beds in the bottoms were formed by the union of two corn rows; and to raise them more, the first four furrows were thrown up with three-horse ploughs. In the foul condition of the bottoms, it would have been preferable to have ploughed them throughout with four horses, which would more thoroughly have subverted the luxuriant grass, have formed higher beds and deeper water-furrows, and from such large ploughs being less likely to be choked and otherwise obstructed, would have involved very little, if any, loss of labor. It may be laid down as an axiom, that the cheapest implement is that which is exactly adequate to the object in view. Could I control the order of succession in which the several portions of land should be sown, it would be as follows: 1st. The low and wet valleys, for greater security against frost and moisture. 2dly. The hill-sides, that the wheat plants, while the weather was still warm, might grow quickly, cover the earth, and bind it together to prevent, with the assistance of deep ploughing and graduated drains, injury from hasty showers. And 3dly. The elevated plains, not likely to be washed or drowned, or affected by frost. I endeavor to put a fourth more seed on low than on highland of equal fertility, and a proportionately larger quantity on stiff than on light land; and the seedsmen alter their hands according to the varying quality of the soil. The quantity of seed too, should increase with the advance of the time of sowing. A bushel in October is considered equal to five pecks the corresponding day in November. For the more regular distribution of the seed, I usually harrow before sowing. A very successful farmer of my acquaintance, who was in the habit of giving but two harrowings, preferred that one should precede the sowing. When cross harrowing is practicable, this preliminary operation is unnecessary, as that prevents the wheat from being drilled along the furrows. I much prefer it when it can be done, which, owing to the shortness of the turns, and filling up of the water-furrows, is rarely the case.

A word at parting, on the preservation of seed wheat. It should be cut ripe, thrashed early, and kept dry, in a secure place at some distance from the thrashing room. Soon after the introduction of the famous white flint, then in great request, I had several hundred bushels of superior quality, which was put in a loft immediately over the machine. Some of the other wheat being smutty, the subtle poison ascended, and thoroughly infected the fine sample above, though lime had been put with it. I have now a well floored and well ventilated room in the roof of a detached building, appropriated, for the time, exclusively to the seed wheat, which is well cleaned, spread 18 inches thick, and occasionally examined and stirred. I have never in a single instance, had wheat, of my own saving, that failed to vegetate well, though I have bought it.

To some of your readers, parts, or indeed, the whole of this article may appear neither novel nor important, but I will remark that I write for the unlearned, not for the learned. What is familiar to one man may be new to another; and the assumption of the contrary does much to obstruct the diffusion of agricultural knowledge.

A PLANTER OF THE LOWER JAMES.

ON THE EFFECTS OF HEAT ON SOIL.

To the Editor of the Farmers' Register.

Fife's, Goochland, March 7, 1835.

In a communication signed John Robert Wallace, found on page 618 of the March No. of the Register, is the following observation. "Heat is the great destroyer of the vegetative or nutritious principles of the earth." Then follows an illustration: "make the richest earth" says he, "into bricks, then pulverize them, and you will find that seed will not sprout in the dust," &c. I know it has often been brought forward as an objection to the fallowing of lands in summer, that the heat of the sun killed them. Still, facts to the contrary appear, which may lead at least, to a few inquiries. I would humbly submit to Mr. Wallace some difficulties that lie in the way of his proposition, and illustration. I could, for example, select lands in the torrid zone, exposed to the heat of a vertical sun, and producing large crops, notwithstanding the frequent stirring in the hottest time of the year. How is this if the sun kills the nutritious principles of the earth? Again, if a farmer will fallow a field for wheat in summer, his stirring that field often does not destroy its vegetative principle. If he plough one-half of it twice, and the other half of it three times, he will find the

best crop on the land thrice ploughed. I could give here a reason for this, but I wish to be short, and only state some of the difficulties to the theory "that heat is a great destroyer of land." If I were going to select a farm, I should doubtless prefer one that lay well to the sun, or that had a southern aspect. Some persons have supposed that covering land so as to preserve it from the heat of the sun is the cause of its producing: this seems to be the opinion of Mr. W. "Take a piece of plank" says he, "12 inches square—place it on a gall; let it remain for one year, and then sow seeds on the place covered by the plank, and on the conterminous earth, and you will find the plants on the space covered by the plank, much more vigorous than their neighbors," &c. That this will be the case, does not prove that the exclusion of heat is the cause. It may be observed, that the ground under such a covering as that, becomes loose,consequently is penetrated by all that is enriching in the gases—and not being exposed to baking rains, is always ready for this food which nature provides so liberally. The conterminous earth is hardened by exposure without culture. For example, let a road run through a rich piece of land, and in proportion as it is trod by man or beast, will its sterility appear. One way to bring it to produce would be to cover it, as this would doubtless loosen it in time. Another way would be by culture, and the better it was broken up the sooner it would return to its original state.

Again he says, "make the richest earth into bricks," &c. It may not be in the burning of the rich land that the nutritious principle is destroyed, but in the preparation for burning, viz. making it into mortar first. Let Mr. W. take rich earth in a dry state and calcine it, and scatter it on his land, he will not only find it sprout seed, but bring it to perfection—especially if there be calcareous earth: and he would find the ashes valuable in proportion to the quantity of calcareous earth. On the other hand, if he will take even lime itself, (I mean slaked lime,) and make it into mortar as bricks are prepared, and then burn it, he will find it lose its virtue almost altogether. His reasons for fall crops not injuring lands equal to spring and summer crops, do not fully satisfy my mind. Oats injure lands, I humbly conceive, for other reasons than he gives. And now for my theory—or shall I call it theorem, for it is well established. *Stirring land wet is the greatest destroyer of good land imaginable.* When land is put in oats it is too often the case that it is stirred wet in the spring, (so it is with corn land) and this produces sterility, and is ascribed to oats, when the blame lies somewhere else. Again, the seeds of weeds which ripen in fall, and are scattered over the surface of the earth, and often have vegetated at or before the time of ploughing for oats, consequently they are turned under and destroyed, and there being no more seed to cover the earth after the oats are sown, the land is thus left bare when the crop is taken off, which leads to the conjecture, that oats empoverish land. The weeds on the wheat land grow from seed not disturbed in the spring, and accounts for the abundance of them on wheat lands in the fall. If land then was ploughed at the same season for oats as for wheat, and only harrowed in the spring, there would be more weeds left on oat land: and if oats would stand the winter and be put in when wheat was, we should have as many weeds after oats as wheat.

I hope nothing I have said will in the least give offence to J. R. W., with whose communications I have been very much pleased. I would be understood as suggesting a few things for farther consideration only, and not as a critic. If a person were to take a quantity of clay (I mean clay that has at least one-tenth calcareous earth in it) and calcine it, it will become a fertilizer of the soil; but if you take the same kind of clay and make it into mortar and calcine it, you will find it useless.

JAMES FIFE.

From Burnes's Travels in Bokhara.

NEW METHOD OF CROSSING A RIVER.

The mode in which we passed the Oxus was singular, and, I believe, quite peculiar to this part of the country. We were drawn by a pair of horses, who were yoked to the boat, on each bow, by a rope fixed to the hair of the mane. The bridle is then put on as if the horse were to be mounted; the boat is pushed into the stream, and, without any other assistance than the horses, is ferried directly across the most rapid channel. A man on board holds the reins of each horse, and allows them to play loosely in the mouth, urging him to swim; and, thus guided, he advances without difficulty. There is not an oar to aid in impelling the boat; and the only assistance from those on board consists in manœuvring a rude rounded pole at the stern, to prevent the vessel from wheeling in the current, and to give both horses clear water to swim. They sometimes use four horses; and in that case, two are fixed at the stern. These horses require no preparatory training, since they indiscriminately yoke all that cross the river. One of the boats was dragged over by the aid of two of our jaded ponies; and the vessel which attempted to follow us without them was carried so far down the stream as to detain us a whole day on the banks, till it could be brought up to the camp of our caravan. By this ingenious mode we crossed a river nearly half a mile wide, and running at the rate of three miles and a half an hour, in fifteen minutes of actual sailing; but there was some detention from having to thread our way among the sand banks that separated the branches. I see nothing to prevent the general adoption of this expeditious mode of passing a river, and it would be an invaluable improvement below the Ghats of India. I had never before seen the horse converted to such a use; and in my travels through India, I had always considered that noble animal as a great incumbrance in crossing a river.

From the Horticultural Register.

ON THE CULTIVATION OF ASPARAGUS.

Having had considerable experience in the cultivation of asparagus, and been so far successful as to raise it nearly two inches in diameter, or between five and six inches in circumference, some of which I exhibited at the Massachusetts Horticultural Society, in the spring of 1833, and which obtained the Society's premium for the largest and best asparagus: having, also, for several years past sold in Quincy market from seventeen to twenty-five cents the bunch, when the same sized bunches of the common kind were selling from six to ten

cents, I am induced at this time to inform you and the public of my method of growing this delicious vegetable. I sow the seed in the same manner and time with blood beets in the spring, preparing the ground in the same way, as the young or seedling plants will thrive in soil that will grow good beets. I generally sow, and think it the best way, one row of beets and another of asparagus alternately, one foot asunder, which brings the beet rows two feet apart, the proper distance for this vegetable.

As asparagus makes a very small growth the first season, it will not in the least interfere with the beet crop; on the other hand, I think it is rather an advantage to the growth of asparagus, as the large leaf of the former serves to protect the weak and slender shoot of the latter.

The nature of the plants likewise differs so materially, one having a long tap root, calculated to draw deep from the soil, the other very small fibrous roots, which invariably, in this plant more than any I have observed, draw juices from the surface; in this case neither draws food from the other, as is apt to be the case when different vegetables, of the same habits and wants grow near each other.

The second season after sowing it will be necessary for the asparagus to occupy the whole ground, the rows being two feet apart, a very proper distance; as the plant makes a large growth the second year, they may stand in the seed rows within an inch of each other. By the above method I have raised from 2 to 5000 roots a year which I have sold.

In choosing and preparing the ground for putting down an asparagus bed, as it is called, I select a piece of ground that has been under tillage the year previous; a sandy loam if I have it; if not, I add sand, the washings of roads or other materials, to bring it as near the nature of the above named soil as possible. I then plough very deep if the soil will admit, 10 inches or more; cart on and spread about twenty cart loads of manure, or in that proportion to the acre. I prefer fresh or unfermented horse manure for this as well as for most other crops. After this, cross-plough not quite so deep as before, and trench furrow by running a plough both ways, in the same furrow, four feet apart; clear out the trenches with a shovel ten inches deep and one foot wide at the bottom, throwing the earth into ridges between the rows as even as possible; lastly, I draw in from the sides of the trenches a small quantity of fine earth, about one inch deep, levelling it with the hoe as it is drawn in, and the ground is prepared for planting. It is very important that the roots should be taken up carefully and exposed as little to the sun and air as possible previous to planting. My method is to start them from the seed bed and put them under cover or into the cellar as soon after digging as possible; then part the roots, which come up in bunches, snarled together, cut off the fingers (so I name the roots) that are broken and ragged and pack them away in meadow moss until I am ready for planting, which is performed as follows: The roots are taken to the field in a basket, packed in moss, and lifted out as you plant, placing them in a straight line on the bottom of the trench, from twelve to fourteen inches apart, taking hold of the crown of the root and pressing it gently down, carefully spreading the roots or fingers horizontally in every direction, as the roots of asparagus naturally grow horizontal—and the fibres or feeders extend upwards to the surface; this I ascertained by examining a bed that had been hoed after cutting time, in June, immediately before a smart shower. The surface of the earth was literally covered with small white fibrous roots. As the bed was situated at the brow of a large hill, a part of it was gullied by the water in one or two places below the main roots, where I had a fine opportunity to examine both roots and fibres. There were few, if any fibres two inches below the main roots, notwithstanding that the bed was put down according to the old method, deep trenching, and filling in six inches below the roots with good rotten manure, which I found safely deposited in rather a decomposed state, having laid several years without being disturbed either by roots, fibres, worms, or weather. It is necessary for a man to follow immediately after the one that places the roots in the bottom of the trench, who has some skill in the use of the hoe; moving backwards, taking care to step each side of the roots in the trench, so as not to disturb them, and with his hoe scraping from each side of the trench regularly, so as to cover the crown of the roots about three inches; and the planting is completed. A field or bed managed in this way has a handsome appearance the first season, if the ridges are kept neat and in a workmanlike manner. Between the rows of asparagus on the top of the ridges, I usually grow a very fine crop of tap rooted plants, which does not in the least injure it the first summer.

After the asparagus shoots have made their appearance about six inches above ground it is a good plan to draw a little earth around the stalks about an inch deep, so as to kill the weeds, which may be repeated in the course of the season without injuring the row of roots on the ridge. The second year after planting, as soon as the frost is out of the ground, spread along in the trenches, which will then be three or four inches deep, about one inch of light compost manure; then with a plough back furrow every row separately, turning the furrows directly over the asparagus, making two bouts to a row, rake or cross harrow, and the bed will be level, requiring no more care that season except keeping down the weeds. The third spring, as soon as the weather permits, burn the old stalks on the ground, spread at the rate of twenty cart loads per acre, of good compost or horse manure, and plough it in, taking care to turn narrow furrows and not so deep as to injure the crown of the root; then rake or harrow, and the bed will be in readiness for gathering, or cutting, which should be done in the following manner: As soon as the shoots project five or six inches above the ground, and before the buds begin to open, cut them off with a knife about one inch or less below the surface of the ground; (not three or four as is recommended by some theorists,) as all that grows below the surface is stringy and tough and not fit to eat. The old stump immediately decays, and makes the best of food for the plants. I continue cutting, about two months from the time I begin in the spring, having no regard to the twenty-first day of June, or any other particular day, as the plant naturally produces a given quantity of shoots every season, without injury to the root.

The above method should be pursued yearly, as long as the bed lasts, which in this climate, I presume will continue to produce well from thirty to forty years, under the above treatment. The bed that produced the large shoots I spoke of, was put in 1819; in 1833, the season I sold my farm, the produce was equal, if not superior, to any former year.

Yours, &c.

D. CHANDLER.

Thompson Island, Feb. 9, 1835.

From the [British] Quarterly Journal of Agriculture.

ON THE POTATO.

By Mr. Robert S. M'Adam, read before the Belfast Natural History Society.

It is singular, that although the potato is now so widely diffused among civilized nations as a staple article of food, its history, and the time of its introduction, are wrapped in great obscurity. Five and twenty years ago, Sir Joseph Banks made a number of interesting researches on the subject, and published the result, under the title of "An attempt to ascertain the time of the introduction of the potato," which proves that even he had not arrived at certainty. This work I have not met with;* but, after a search through a great number of other sources, I have been able to collect the following particulars.

In the beginning of the sixteenth century, I find that the *Spanish sweet potato*, a species of Convolvulus, was common in gardens over Europe. It was first introduced into Spain from the West Indies, and bore the Indian name of Battata. There is also a possibility of its having come to Europe from the east, as it is a native both of India and China. Old Gerard, the English herbalist, gives the following account of this plant in his usual quaint style. "This plant," says he, "which is called Sisarum Peruvianum, or Skyrrists of Peru, is generally by us called Potatus or Potatoes. There is not any that has written of this plant, or said any thing of the flowers; therefore I refer the description thereof unto those that shall hereafter have further knowledge of the same; yet have I had in my garden divers roots that have flourished unto the first appproach of winter, and have grown unto a great length of branches, but they brought not forth any flowers at all. The roots are many, thick, and knobbie, like unto the roots of peionies, or rather of the asphodill, joined together at the top into one head, in the manner of the skyrrit, which being divided into divers parts and planted, do make great increase, especially if the greatest roots be cut into divers gobbets, and planted in good fertill ground. The potatoes grow in India, Barbarie, Spaine, and other hotte regions, of which I planted divers roots (that I bought at the Exchange in London,) in my garden, where they flourished until winter, at which time they perished and rotted. The potato roots are, among the Spaniards, Italians, and many other nations, common and ordinary meate; which, no doubt, are of mighty nourishing parts, and do strengthen and comfort nature; whose nutriment is, as it were, a meane between flesh and fruit, though somewhat windie; but, being rosted in the embers, they do lose much of their windiness, especially being eaten sopped in wine. Of these roots may be made conserves, no less toothsome, wholesome, and daintie, than of the flesh of quinces. And likewise these comfortable and delicate meates, called in shops Morselli, Placentulæ, and divers other such like. These roots may serve as a ground of foundation whereon the cunning confectioner or sugar-baker may worke and frame many comfortable delicate conserves and restorative sweet-meats. They are used to be eaten rosted in the ashes; some, when they be so rosted, infuse them and sop them in wine; and others, to give them the greater grace in eating, do boil them with prunes, and so eate them." These sweet potatoes were long used in England as a delicacy, and were imported, in considerable quantities, from Spain and the Canary Islands, being supposed to have the peculiar property of restoring decayed vigor in men. The famous *kissing comfits*, so much in vogue in Shakspeare's day, and with which our ancestors were imposed upon, as we are by universal pills, and other modern omnipotent remedies, were made principally of these and eringo roots. Falstaff says in the Merry Wives of Windsor.*

"Let it rain potatoes and hail kissing comfits."

I shall only mention further, with respect to this plant, the Battata, that it grows abundantly in Jamaica, Barbadoes, and the other West India islands, and that it is propagated, not like our potato, but by slips. The pounded or grated roots make excellent puddings and cakes; and, when mashed and fermented, a cooling and refreshing drink is made from them, called *Mobby*, somewhat resembling small-beer.

The potato now in use, the *Solanum tuberosum* of botanists, according to the Spanish historians, was found in cultivation on the first arrival of the Spaniards in Chili and Peru. Peter Cieca informs us, in his Chronicle, published in 1553, that the inhabitants of Quito, and its vicinity, have, besides maize, a tuberous root which they eat, and call Papas. Molina, in his Natural History of Chili, vol. ii, quotes the authority of several ancient writers to prove that the plant is indigenous there. He describes two species or varieties, the one wild, and with small bitter roots, the other, the one under cultivation; but appears to consider both to have been the same originally—cultivation rendering the wild plant sweet and succulent, exactly as in the case of our carrot. The Spaniards having introduced these roots into their own country, did not retain their Peruvian name, but from their similarity in nature to the sweet potato already in use, called them also Battatas. From Spain they were carried into Italy, where they were known by the same name as *truffles, taratoufli*. The first European writer (after those alluded to,) who takes any notice of them, is the famous German botanist Clusius, who mentions having received two roots, in the year 1588, while residing at Vienna, from the Governor of Mons, in the province of Hainault; who, it seems, had himself procured them from the attendant of the Pope's legate, un-

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*It forms art. 2. in the first volume of the Transactions of the Horticultural Society of London, 1805. Ed.

*Act V. Scene 5.

der the name of *Taratoufli*. He gives a plate of it among his rare plants. So much for its introduction on the Continent of Europe.

In the year 1584, Sir Walter Raleigh, under the authority of a patent granted by Queen Elizabeth, for discovering and planting new countries not possessed by Christians, sent out a number of colonists to Virginia. Now, although no absolute proof can be brought forward on the subject, yet, from concurring circumstances, and from tradition, it appears highly probable that the potato now in use amongst us was first brought to Ireland, either by Sir Walter himself, on his return from his voyage, or was afterwards sent to him by the Governor of Virginia. The general opinion is, that he had them planted in his own garden near Youghal, in the county of Cork. He is said to have given them to his gardener as a fine fruit from America, and ordered them to be put down in his kitchen garden. In August the plants flowered, and in September they produced their apples; but these were so totally different from what the gardener had expected to see, that, in a fit of ill humor, he pulled them and carried them to his master; asking him "were these the fine American fruit." Sir Walter either really was, or pretended to be ignorant of the matter; and, having tasted them, told the man to dig up the *weeds* and throw them away. The gardener did so, but was astonished to find about a bushel of tuberous roots. Trial soon showed that this was the eatable part of the plant. The only written proof we have of the introduction of the potato by Raleigh, is found in the manuscript minutes of the Royal Society of London, December 13, 1693, when we are told the president, Sir Robert Southwell, informed the fellows that his grandfather first cultivated potatoes in Ireland; and that he got them from Sir Walter Raleigh. They were cultivated a long time in Ireland before they were known in England, and they were only at last introduced there by the shipwreck of a vessel containing some of them, on the coast of Lancashire, at a place called North Meols, which is still famons for their cultivation. Gerard, whom I have already quoted, describes them distinctly from the sweet potato, and calls them Virginian Potatoes. He says, "I have received roots hereof from Virginia, otherwise called Norembega, which grow and prosper in my garden, as in their native countrie. The Indians do call this plant *Papus* (meaning the rootes,) by which name also the common potatoes are called in those Indian countries."

We have thus seen the same plant brought from South America by the Spaniards, and from North America by the English. Now, it is remarkable, that, at the conquest of Mexico, in the reign of Montezuma, the potato was quite unknown in that country. How is it, then, that a plant belonging originally to the southern hemisphere should be found at the foot of the Alleghany Mountains, while it was unknown in the intermediate country, Mexico? Humboldt is the person who agitates this question. He proves satisfactorily that the potato is not indigenous in Peru, nor found wild in any part of the Andes situated under the tropics; no where, in fact, but in Chili, from which place we may conjecture it to have been propagated northwards under the government of the Incas. Again, he proves the improbability of the potato having been brought to North America by any of the Peruvian tribes, both from physical and moral causes; and, combining this with the above mentioned singular fact respecting Mexico, he starts a new idea, that the English colonists of Virginia themselves procured the plant from the Spanish settlements. "The colony," he remarks, "was in existence from July 1584. Now, the navigators of those times were not in the habit of steering straight westward to reach the coast of America; they were still in the practice of following the track indicated by Columbus, and profiting by the trade-winds of the torrid zone. This passage faciliated communication with the West India Islands, which were then the centre of Spanish commerce. It appears, then, natural enough that the English themselves brought potatoes from South America into Virginia. At the time when they came from Virginia to England, they were common both in Spain and Italy. We are not then to be astonished, that a production, which had passed from one continent to another, could in America pass from the Spanish to the English colonies."*

From all these different considerations, conjoined with what I have already brought forward of the history of the plant, I think we are almost warranted in conculding that Chili alone is the native country of the potato.

We may now, in a cursory manner, glance at its subsequent history in these countries. The next writer after old Gerard who mentions it is Lord Bacon. Speaking of ale, he observes, "If ale was brewed with one-fourth part of some fat root, such as the potato, to three-fourths of grain, it would be more conducive to longevity than with grain alone."† The potato still appears to have been only cultivated in gardens as a curious plant. It was considered a great delicacy in the reign of James the First. In the year 1619 we find it mentioned as one of the articles provided for the use of the queen's household. The quantity procured was very small, and the price two shillings a-pound.‡ In the following reign, and during the continuance of the Commonwealth, the potato remained equally scarce. Its cultivation, meantime, spread slowly over Ireland, and still more slowly in Lancashire. The first time that it was brought before the public as an object of national importance, was at a meeting of the Royal Society held in March 1663, when the letter was read from Mr. Buckland, a gentleman of Somersetshire, strongly recommending the culture of potatoes in all parts of the kingdom as a precaution against famine. This was referred to a committee, and upon their report, the thanks of the Society were given to Mr. Buckland, all the members who had lands were entreated to plant them, and Mr. Evelyne was directed to mention the matter at the end of his "Sylva," a book then publishing under the auspices of the Society.‖ These exertions of a scientific body do not seem to have produced much effect, and as a late writer remarks, "if we may judge by the opinions which were published respecting the plant, we must conclude, that the necessities of the poor of Ireland (who have always been left too entirely to their own resources,) did more to promote the cultivation of potatoes, than all the

*Nueva Espana. †Bacon, Nat. Hist.
‡Eden on the State of the Poor.
‖Birch, History of the Royal Society.

labors of the learned, and the philanthropy of the patriotic."* In books of gardening published towards the close of the 17th century, potatoes are spoken of in no very high terms. "They are much used," says one writer, "in Ireland and America as bread, and might be propagated with advantage to poor people." Another says, "I do not hear that it hath been yet essayed whether they may not be propagated in large quantities for food for swine and other cattle." The famous nurserymen, London and Wise, have not considered the potato worthy of a place in their Complete Gardener, published in 1719; and several other writers speak of it as far inferior to radishes! This was more than 100 years after its introduction. One reason, certainly, that the plant remained so long in disrepute, was the defective mode of its culture. The early planting and late raising of the potatoes, very much injured their quality. This and ignorance of the proper mode of cooking them, would make them certainly any thing but a tempting article of food. The following anecdote illustrates this. "A person who had been invited to taste the first potatoes planted in the Country of Forfar, about the year 1730, related that the roots had been merely heated, and that they adhered to the teeth like glue, while their flavor was far from agreeable. The food was about to be condemned through the ignorance of the cook, when the accidental arrival of a gentleman, who had tasted a potato in Lancashire, caused the rejected roots to be remanded back to the hot turf ashes, till they became as dainty as they had before been nauseous."

According to the old Statistical Account of Scotland, potatoes were first cultivated in the fields there, in the year 1739, in the County of Sterling: and Dr. Walker assures us that they were not known in the Highlands and Isles till 1743. It is stated in the General Report of Scotland, (vol. ii. p. 111) as a well ascertained fact, that "in the year 1725–6, the few potato plants then existing in gardens about Edinburgh: were left in the same spot of ground from year to year, as recommended by Evelyn: a few tubers were perhaps removed for use in the autumn, and the parent plants well covered with litter to save them from the winter's frost." Notwithstanding the success that after this period attended the culture of the potato among the cottagers, its progress among the higher classes in Scotland was retarded by the opinions of the different writers on agricultural subjects, already mentioned: and also, what is not a little singular, a mistaken zeal in religious matters made some of the Scotch folks hostile to the innovation. "Potatoes," said they, "are not mentioned in the Bible;" and this was deemed quite a sufficient reason for rejecting them. Famine at last gave the great impulse to the cultivation of this root, and during the latter part of the 18th century, it gradually spread over the country, and its excellent qualities became generally understood.

I shall not occupy your time by tracing its progress through the various other countries of Europe. I may merely mention that the Netherlands received it from England; and that from thence it found its way into different parts of Germany. It was very late before it came into general cultivation in Sweden and Denmark, and even Saxony, but in all these countries it is universally used at present. In Switzerland potatoes seem to have been introduced about the year 1720; they now form a principal article of food there. Poland is perhaps as remarkable as Ireland for their extensive cultivation. Of late years they have been introduced into the British settlements in India, and, as Bishop Heber remarks, "with great prospect of success. Many places have been found suited for their culture, and though the Hindoos at first were unwilling to adopt the use of them, their prejudices have been gradually overcome, and potatoes may some time hence rival rice in its general utility among them." "It is only within these forty years that any particular attention has been paid in France to the cultivation of potatoes. They were long regarded as an unwholesome plant, and only fit to be eaten by cattle and the most wretched of human beings. It is probable that the French had only cultivated the inferior sorts, and did not know that better kinds could be procured. Parmentier, so distinguished by his zeal for chemistry, was the first who made any successful exertions in behalf of this decried and unpopular plant. He thought that the best plan to introduce it into general use was to make it popular with the higher orders. For that purpose, in 1785, he presented Louis XVI. with a nosegay made with the flowers of the potato, and the sovereign graciously received the emblem of a plant, the most likely of any, to guarantee his subjects against the horrors of famine. This ingenious mode of bringing a plant, which had hitherto been so much despised into fashion, was eminently successful. The courtiers, always ready to flatter the taste and wishes of their monarch, hastened to cultivate an article honored with his regard: and thus France, in a great measure, owes the more extensive culture of potatoes to courtly flattery."*

To give a description of the potato plant in an Irish assembly, would certainly be an unnecessary undertaking; with equal reason, I might begin to describe a shower of rain, for both must be as familiar to every one as the light of day. My remarks, therefore, on this part of the subject shall be very brief. The potato, because it grows under ground, has been usually called a root, but improperly. It more nearly resembles a kind of under ground fruit; and, in conformity with this idea, the French have given it the name of pomme de terre or ground-apple. The potato, in fact, belongs to the class of plants called tuberous-rooted, or those having roundish knobs intermixed with the fibres, which constitute the real roots that draw nourishment from the earth. These tubers or knobs have been considered as so many under ground stems, enlarged by a deposition of farinaceous matter; and when, by any chance, they lose while growing their covering of earth, and continue to grow exposed to the light, they assume the same green color as the rest of the plant. But I am rather inclined to consider them as a mode of increase analogous to the viviparous production of a part of the animal kingdom; while the seed or apple from the flower corresponds to the oviparous propagation of birds. Tuberous-rooted plants, therefore, are furnished by nature with a two-fold mode of increase. The potato,

*Library of Entertaining Knowledge.

*Sir John Sinclair.

besides, may be considered a perennial plant, as it may continue to spring up for many successive years on the same spot. It belongs to the genus of plants called *Solanum*, many species of which, such as the nightshade, are extremely poisonous. In Jamaica, the root of one species is a violent purgative, and a spoonful or two is used by the natives as a dose. It might startle a person at first to find the principal food of a large portion of mankind, particularly our own countrymen, drawn from a vegetable belonging to so poisonous a group. Two circumstances also would seem to prove that a portion of deleterious matter does actually exist in the potato. One is, that potatoes, whether in their parent bed or in the pit in which they were preserved after being dug up, if they are uncovered, *take the wind* (as it is called,) and become unwholesome food for men, occasioning sickness, and greatly disordering the body. They are easily known by being of a different color from those of the same crop which lie at a greater depth. These surface potatoes, however, may be used as seed, and besides are not unwholesome for pigs. The other circumstance is, that the liquid contained in raw potatoes must contain some matter hostile to *animal life*, as cattle and hogs have been greatly injured by drinking of the water in which they have been boiled. To counterbalance this, on the other hand, a distinguished agriculturist maintains that substances noxious to *animal* life are generally beneficial to *vegetable* life; and with regard to the juices of the potato in particular, that they contain various substances favorable to vegetation, which may be rendered of great use in the irrigation of grass lands.* These two facts are the only ones which the experience of two hundred years has discovered to furnish an objection to the use of the potato; and when I shall have laid before you the long catalogue of advantages derived from its introduction among us, I am persuaded they will be considered as mere trifles. The danger is obviated simply by being known. In different quarters of the globe, whole nations subsist on roots which are deadly poison in their unprepared state, but which become safe and nutritious when cooked by fire. The most remarkable examples of this are found in the natives of the Molucca and Society Islands, and the Indians of South America. In the island of Hayti, the juice of the very root which is used when dressed in the same way as we employ the potato, has been often swallowed by some of the miserable natives to put an end to their existence. Oviedo relates, as an eye witness, that these unhappy wretches, who, like many African tribes, preferred death to slavery, united together by fifties to swallow at once the poisonous juice of the Jatropha.†

All vegetable productions affording food are found to contain, in some proportion or other, a farinaceous or granular substance devoid of fibre, which, when dried, may be ground or pounded into flour or meal; and which, if boiled in water, will form with it a pulpy matter. The vegetable substances which contain most of this matter are seeds and tubers, these parts of the plant being intended by nature to contain a store of food, as it were, for the young germ, sufficient to nourish it until the production of members or instruments capable of collecting nutriment for it after its exclusion, precisely analogous to the provision of yolk laid up in the egg of a bird for the young being enclosed in it. From accurate chemical examination, it has been found that in every 100 parts of the potato, there are about 70 parts of water and 30 of potato-meal, which is a powder of a grayish color, having the taste of the raw root. This meal being submitted to further analysis, is found to be composed of three different substances. 1st, starch or fecula, 16 parts; 2d, leafy or fibrous matter, 9 parts; and 3rd, soluble mucilage, 5 parts. The potato also contains a very small portion of potash, and a few other substances, such as oxides of iron and manganese, common salt, &c., but in such minute quantities as not to affect the general statement I have made. An essential oil likewise exists in the potato, which gives its taste, but this is also very trifling. The composition of the potato root is extremely similar to that of the seeds of wheat and maize, though, from the dissimilarity in taste and external appearance, this would not be at first suspected; and hence arises the corresponding fitness of all three for food. The principal difference between wheat and potatoes consists in the presence of a substance called *gluten* in wheat, which strongly resembles animal glue, and which is the cause that wheat, rye, and barley are the only kinds of grain of which loaf bread can be made; this *gluten* giving tenacity and firmness, while it at the same time promotes the fermentation in the making of bread, as well as gives it its taste. In potatoes, oats, beans, peas, rice, maize, buckwheat, &c., this is entirely wanting, and therefore they must be mixed with a certain quantity of flour before they can be made into bread.

There is perhaps no species of food that can be consumed in a greater variety of ways than the potato. Among us the only modes in use are three or four, such as boiling, roasting, or frying; but our French neighbors, who surpass us and all the world in every thing relating to cookery, at least so far as infinite variety is concerned, have several other ways of preparing this root. A French gentleman invited to dinner thirty-two of his friends, promising to each a different dish, and yet all composed of the same material. They assembled, found before each seat a cover, and, upon taking their seats, discovered that each guest had really a different dish, though all formed of eggs! One of the company immediately repeated the invitation to all the persons present for next day, when he promised to regale them in a similar manner, on another single substance metamorphosed into thirty-two different forms. They came and dined very comfortably on thirty-two distinct and palatable dishes all composed of potatoes! Boiling is the simplest, cheapest, and perhaps most nutritious mode of cooking the potato. When boiled, the nourishing substances contained in it are taken into the stomach, more intimately diffused through about three times their weight of water, than is the case with any artificial mixture of the potato-meal and water. Hence the easiness of digestion and lightness of this root above almost all other farinaceous substances equally nutritive; while its cheapness, and the ease with which it can be cooked, are great arguments in its favor with the great body of the peo-

* Sir John Sinclair.

† Humboldt.

ple. Every one knows that, simple as the process of boiling a potato appears, there is really a peculiar art or dexterity required; and it is often remarked, "that good potatoes are less frequently to be seen at the tables of those who keep professed cooks than in the wooden bowl of the peasant." But the fact is, that in the one case there is only one dish to attend to, whereas in the other there are many, and that the potatoes of the cottager are consumed *hot from the fire*, as soon as they are ready, which is not the case in the other instance. Next to boiling, roasting the potato is the mode most employed; but this is exceptionable, as the root retains in it much of that black unwholesome liquid which I have already mentioned. This resides principally in the skin, and hence those persons who have been tempted to eat the roasted skin, have been often seriously disordered by it. Custom, however, is found to render the stomach callous to its effects, as is evident from the practice of the children of our Irish peasantry. Throughout all the country it is usual, as every person must have observed, to allow the little children in every cottage to *roast potatoes* for their own use, as often as they please, in the turf ashes. As you ride by a cabin, you frequently see a group of children run to the door, each holding in his hand a roasted potato.

The limits of a paper such as the present, will not permit me to enter into many interesting topics connected with my subject. I must omit entirely giving any details respecting the culture of the potato, its varieties, or the various diseases to which the plant is liable, though on all these a vast number of curious and ingenious experiments have been made, and, I may add, whole *libraries* written. I shall pass over the various advantages derived from the use of it in feeding the different kinds of domestic animals, one remarkable consequence of which is the vast increase of the Irish pork trade. I shall likewise omit all mention of the beneficial effects produced on the lands of this country by the cultivation of the plant, merely reminding you that it is one of the great instruments by which our bogs are reclaimed; and I shall now proceed to lay before you some of its uses which are less obvious and more seldom described.

The first manufactured ingredient derived from the potato was starch. This substance, formerly obtained from wheat alone, was first discovered in the island of Chios, in the Grecian Archipelago, and was in common use among the Romans. The potato starch is made by the simple process of grating the roots into clear spring water, when it separates from the other particles, and sinks to the bottom. It is a very remarkable circumstance, that in *frosted* potatoes, it is only the *juice*, or liquid part of the root that is affected, and not at all the farina or flour, which may be equally well extracted, and will be found as white and good as if it had not been frozen, provided the root is not quite rotted, which in process of time it will become. The following singular illustration of this took place in 1794: a field of potatoes at Camstradden, in Dumbartonshire, was laid under water, by a sudden rise of Lochlomond. A quantity of these was got up, and in part brought home. Being wet, they were laid on the floors of outhouses to dry; but in a few days they were so spoiled as to be unfit for feeding cattle. A heap of the potatoes was left on the ground; when turned over next spring, some starch was found at the bottom, which excited a suspicion, that though the root had been affected by the frost, yet that the flour had remained uninjured. This was found to be the case; and a quantity of the farina was collected from the heap, part of which was distributed in Dumbartonshire, and the remainder was brought to Stirling, in 1804. As arrow-root had become fashionable about that time, it was often used as a substitute; and many eat of it without knowing the difference. In 1825 a dish of it was made with milk, and two gentlemen who supped on it, declared that they would not have known it from arrow-root. A specimen of this same flour of 1794 was sent to Sir John Sinclair in 1826, and it seemed as good as any produced from the potatoes of that year, after having been kept for above thirty years.* Potato-flour is very easily converted into jelly, in the same way as arrow-root, by gradually pouring into it some boiling water, and stirring the mixture about; and in this shape it is strongly recommended as food for invalids, sometimes being taken with a little milk and sugar. With the addition and thorough mixture of a little wheaten flour, or ground rice, while it is boiling, it forms a pleasant and nourishing diet either with or without milk. It is well known that the manufacture of bread, even when conducted by the most skilful and experienced bakers, is sometimes very difficult. From the various casualties to which wheaten flour has been liable, from disease in the crop, or bad management in the keeping or grinding of the grain, it frequently loses some of its most essential qualities, and causes the bread, in defiance of the baker's art, to contract a sourness, which is both disagreeable to the taste, and prejudicial to health. Fortunately a remedy has been discovered of late years; that of mixing with the flour a small quantity of *potato-starch, previously converted into a jelly.* This kind of bread is remarkably light, and keeps longer moist than other bread. It toasts much better, and makes better bread puddings. Another most important use to which potato-flour can be applied, is to give it, boiled in milk, in the proportion of two spoonfuls of flour to one pint of milk, to young children, brought up by hand, and not at the breast, or after they are weaned from the breast. In this country a great quantity of starch is consumed in making what is called the *dressing* for weaver's webs. Until of late, this was entirely made from wheat, and still a great proportion of it is so. But if potato starch were universally adopted for the purpose, as is the case now throughout France, a very great consumption of wheat would be saved. This substance is also put to another use, namely, the making of size, which, for some purposes, such as white-washing, is greatly superior to common size, as it has no offensive smell, and has a more durable whiteness.

The next useful product derivable from the potato is one which, before the days of chemical knowledge, might justly have been considered as wonderful as the conversion of lead into gold, promised by the alchymists: I mean *sugar*. The discovery by chemical analysis, that the potato, though far different in form, taste, and all external qualities, was perfectly similar in component parts to the different kinds of grain used for the food of

* Sir John Sinclair.

man, led naturally to inquiries, whether the products derived from these grains, by submitting them to different chemical operations, might not be procured also from this root. Complete success was the consequence. It was found, among other things, that a substance, possessing all the properties of sugar, though differing a little from that of the sugar cane, could be procured by a simple operation from the potato. Until lately, however, the discovery was considered only as a matter of curiosity, and was mentioned only among men of science. Two years ago, experiments were tried, on an extensive scale, in the United States of America, to ascertain whether, in districts where the potato grows abundantly, this sugar might not be made advantageously both to the population of the district, and to the manufacturer himself. I have seen an account of the process, and the results, which are very interesting. The potatoes were ground by a very ingenius and simple method, by exposing them through a box or hopper to the action of a wooden cylinder, having nailed upon it long strips of iron punched full of holes, to give them a rough grating surface. This cylinder was driven by a band of leather attached to the drum of a water-wheel. On filling the hopper with potatoes, and giving the grater the necessary motion, the potatoes were reduced with surprising rapidity to a fine pulp, from which, by the aid of a sieve and water, the starch, in great purity, was readily obtained. This apparatus ground 3500 bushels of potatoes without the least repair. The starch thus obtained was then dissolved completely in water, heated by steam let into it. A certain quantity of sulphuric acid, or vitriol, was then mixed with it, and heat being applied, the whole of the starch was converted into syrup. This was purified from the acid by adding quicklime, and then evaporated; when the result was an excellent sugar fit for all domestic purposes. A bushel of potatoes, weighing 60 lbs., gives 8 lbs. of pure dry starch; and from these 8 lbs., 7½ lbs. of sugar are obtained. This sugar ferments briskly, when made into beer, and yields a healthful and pleasant beverage. It will be of most use, however, for making sweetmeats, and may be used at table in place of honey, for which it is a good substitute. It has already become a great favorite with most persons who have become acquainted with it. Its taste is that of a delicious sweet, and as an article of diet it is probably more healthful, and less oppressive to the stomach, than any other sweet substance in use.* Potatoes (as I find from the account of a traveller,) are used extensively in the eastern part of Russia for making treacle, which is quite as sweet and good as that which we obtain from the tropics, but having less consistence.

As all substances containing saccharine matter are capable of producing ardent spirit, we would naturally be led to expect, from the foregoing remarks, that it might be procured from the potato: and such is the fact. In 1747, experiments on the distillation of brandy from potatoes were made in Sweden, and the result was so favorable that it was proposed to substitute them in a great measure for grain. In England Dr. Anderson was the first who obtained spirits from this plant, and the account which he published of his operations is very interesting. The potatoes were boiled to a pulp, bruised, and the skins thrown away. Water was then added, and a great quantity of yeast mixed with it. In twelve hours it fermented, and this was kept up by occasional stirring for a fortnight. The liquor, which was now slightly acid, was distilled, and, from 72 lbs. of potatoes which had been used, was obtained a gallon of pure spirits considerably above proof, and a quart more below proof. "This," says the Doctor, "was in every respect the finest and most agreeable vinous spirit I ever saw. In taste it somewhat resembled brandy, but it was more mild than any brandy I ever tasted; and had a certain kind of coolness on the palate peculiar to itself, by which it might be readily distinguished by a nice judge from any other kind of spirit. Its flavor more nearly resembled brandy impregnated with the odor of violets and raspberries, than any thing else to which I could compare it. A single glass of it put into a bowl of rum punch, made it appear as if it had consisted half and half of rum and brandy, impregnated with the juice of raspberries. It seemed to derive its flavor from a subtile essential oil of a very singular kind." "I have been at great pains," continues the Doctor, "to describe this kind of spirit in its state of perfection, because I have since heard of and seen some spirits said to be drawn from potatoes, which, from want of skill or caution on the part of the operators, were intolerably nauseous."* It has been supposed, as I before remarked, that, with proper management, potatoes might form a cheaper material than barley to extract spirits from; and accordingly, I find, that, at present, in the Isle of Guernsey, there is a distillery where they are used with success; and, in 1821, there were actually in Paris twenty distilleries for extracting brandy from the potato starch, and nearly as many more within a circle of eight leagues round it. In 1822 these were all put a stop to, for some reason connected with the revenue laws, and I cannot learn whether they have since been resumed.†

The next product of the potato is a kind of *cheese*. The manufacture of this is carried on in Thuringia and Saxony, and it has the advantage of retaining its freshness for several years, provided it be kept in close vessels. It is prepared by boiling the potatoes, and reducing them, when cold, to a pulp, rejecting the skins. Sour milk is added, or else sweet curd with the whey pressed out, in the proportion of a pint to five pounds of pulp. It is kneaded several times, drained in small baskets, and simply dried in the shade.‡

In some parts of Germany potatoes are put to another use. The lower classes are accustomed to incorporate them, after being steamed and reduced to a paste, with the butter to be spread over bread. It thus goes farther where economy is studied: and that it may longer be preserved, is often salted.§

It will surprise many to learn, that a mode has been suggested by a French chemist for converting potatoes into a substance resembling coffee. He mixes some best olive-oil with a certain portion of dried potato-flour, and then adds a small quan-

* Silliman's Journal.

* Bath Society Papers.
† Sir John Sinclair.
‡ Ibid. § Ibid.

tity of coffee-powder. He asserts that this will produce a liquor more agreeable than coffee.

Chemical ingenuity has likewise converted this most useful root into substitutes for many other articles; as chocolate, tapioca, and vermicelli. The use of potato starch instead of arrow-root, I have already mentioned; and much of it is at present sold under the name of arrow-root, and, in France, under that of fécule de pomme de terre.

A chemist in Copenhagen has discovered that the flowers of the plant may be used in dyeing. By this means a beautiful yellow color may be obtained, which is solid and durable. By plunging the color into blue, it becomes a perfect green. It has likewise been found, that the juice contained in the potato will produce a gray color of great beauty. The liquor drawn off in the process of making potato-starch will clean silks, woollens, or cottons, without damage to the texture or color. It is also good for cleaning wainscots.

Potatoes are used with excellent effect in the boilers of steam engines, for preventing the gathering of a calcareous incrustation on the bottom, which is gradually deposited from the water employed. The potatoes give out a glutinous substance which entangles the particles in the water, and prevents them from incrusting the iron of the boiler.* A medical use of the potato has been lately suggested in a valuable French publication; namely, as a preventive of, and even cure for the scurvy. Roasted potatoes were administered with perfect success to sailors afflicted with the disorder, after other approved medicines had been given in vain. As *roasted* potatoes are the most effectual, it seems probable that the remedy depends on some of the substances contained in the black liquid which boils out of potatoes, and which is retained in roasting.

I have now described the various uses to which these valuable roots may be applied. I have shown, that from them may be procured bread, starch, jelly, sugar, treacle, beer, brandy, cheese, butter, coffee, tapioca, dye-stuffs, size, cleansing liquids, and medicine. I may close the catalogue by an account taken from a work published in 1710, upon the virtues of herbs. The author, after mentioning that potatoes make very good food for man, either boiled, baked, or roasted, when eaten with good butter, salt, juice of oranges or lemons, and double refined sugar, then goes on to speak of the virtues of what he calls the blood of potatoes. For the mode of preparing this valuable ingredient, he refers his readers to the description of the method of extracting a similar blood from parsnips. After reducing them to a pulp, he mixes them with crumbs of white bread, and sprinkles them with white port wine: after sundry distillations (which need not be recited here,) "the matter is changed," says he, "into a rubicund or bloody chyle." This is to be forced out strongly with a press, and the juice exposed to a variety of operations, "till the blood becomes quite clear, and of a most perfect red." "From this," he continues, "you may, if you please, separate, by an alembic, a thin and clear liquor, so you have remaining in the bottom the blood of potatoes of a very glorious color! It hath all the properties of the roots boiled, baked, roasted, or made into bread, puddings, or broth. It invigorates to a strange degree." "The potato-blood," he says, "may be taken with good effect, a spoonful or two morning, noon, and night, in a glass of choice Canary, Malaga, or other good wines!"*

At different times considerable diversity of opinion has been expressed by agricultural writers respecting the comparative merits of potatoes and wheat, as articles of food and culture. The most violent enemy of the potato is Cobbett, who abuses it in no gentle terms. He styles it a degrading root, attributes to it the poverty and misery of the Irish, and at the same time denies its superior economy. He first tries to show that more actual nourishing matter is derived from an acre of wheat than one of potatoes. "Then," says he, "the expense of seed and planting is about equal; but the potatoes require cultivation during their growth, which the wheat does not; and a large cost for gathering, housing, and keeping, besides that of loss by frost: and they yield nothing in the place of straw, which, from the wheat crop, may be worth £4 or £5 an acre." "Then comes," says he, "the expense of cooking. Thirty-two bushels of wheat (the produce of an acre,) supposing a bushel to be baked at a time, would demand *thirty-two heatings of the oven.* Suppose a bushel of potatoes to be cooked every day, in order to supply the place of this bread, then we have (to prepare the produce of an acre) 900 boilings of the pot, unless *cold potatoes* be eaten at some of the meals, and in that case the diet must be *cheering* indeed! Think of the labor, think of the time, think of all the peelings, and washings, and messings attending these 900 *boilings of the pot!* For it must be a considerable time before the English people can be brought to eat potatoes in the Irish style; that is to say, scratch them out of the earth with their paws, toss them into a pot without washing, and when boiled, turn them out on a dirty board, and then sit round that board, peel the skin and dirt from one at a time, and eat the inside!" Again, after describing the process of baking, and exhorting to the practice at home, he says, "and pray what is pleasanter to behold? Talk indeed of your pantomimes and gaudy shows, your processions, and installations, and coronations! Give me for a beautiful sight, a neat and smart woman, heating her oven and setting her bread!" "And what is the result of her labor? Why, good wholesome food, sufficient for a considerable family for a week, prepared in three or four hours. To get this quantity of food, *fit to be eaten*, in the shape of potatoes, how many fires, what a washing, what a boiling, what a peeling, and what a slopping! The cottage everlastingly in a litter; the woman's hands everlastingly wet and dirty; the children grimed up to the eyes with dust, fixed on by the potato-starch, and ragged as colts; the poor mother's time all being devoted to the everlasting boilings of the pot!"†

We Irish can readily observe that this picture is greatly overdrawn to answer the writer's purpose; he has, indeed, made use of the Irishman's own weapon, hyperbole, against him. *We* can likewise perceive, in spite of all that has been argued and asserted, that the potato is not the *root*

* Silliman's Journal.

* Salmon's Herbal.

† Cobbett's Cottage Economy.

of Ireland's misery; that must be looked for elsewhere. But that it has been one great cause of multiplying our population to a surprising extent, is very evident. Let us hear the remarks of a writer in one of our most distinguished periodicals. "Potatoes enter for a great deal into the present condition of Ireland. They are much cheaper than wheat, and it is so easy to rear a family on them, that there is no check to population from the difficulty of procuring food. The population, therefore, now goes on with a rapidity approaching almost to that of new countries, and in a much greater ratio than the improving agriculture and manufactures can find employment for it. All degrees of nations begin with living in pig-styes. The king or the priest first gets out of them, then the noble, then the pauper, in proportion as each class becomes more and more opulent; better tastes arise from better circumstances, and the luxury of one period is the wretchedness and poverty of another. English peasants, in the time of Henry VII. were lodged as badly as Irish peasants now are; but the population was limited by the difficulty of procuring a corn subsistence. The improvements of England were more rapid, the price of labor rose, and with it the comfort and luxury of the peasant, who is now decently lodged and clothed, and who would think himself in the last stage of wretchedness, if he had nothing but an iron pot in a mud house, and plenty of potatoes in it. The use of the potato was introduced into Ireland when the wretched accommodation of her peasantry bore some proportion to the state of the accommodation of that class all over Europe. But they have increased their population so fast, and, in conjunction with different causes retarding improvement, have kept the price of labor so low, that the Irish poor have never been able to emerge from their mud cabins, or acquire any taste for cleanliness or decency of appearance."*

Cobbett's assertion that wheat produces more nutritious matter per acre than potatoes, is now completely disproved. Later experiments have shown that it is very near the truth to estimate the proportion of the nutritive power of wheat to that of potatoes, as about seven to two; or, in other words, that two pounds of wheat afford as much sustenance as seven pounds of potatoes, though it may be doubtful whether it affords as much nourishment. Then, by calculating the produce of each of the two crops, it has been determined that one acre of wheat will produce sustenance for three persons, as long as an acre of potatoes affords it to six and five-sixths. This is upon the supposition that the power of nutrition of a plant is only in proportion to the quantity of farinaceous and glutinous matter contained in it. But this is by no means certain. We have not yet been able to discover what it is that renders one substance more proper for food than another. We have only approximated to the truth; for, although we can, by artificial means, condense the nourishing principle into small bounds, as in the case of essences, concentrated soups, &c.; yet we find that no animal can long continue to live on such substances undiluted. The stomach seems to require that the nutritious matter should be incorporated with, and enveloped, in a considerable quantity of some other substance, possessing no nourishing power, in order that its functions may not be stimulated to excess. Sugar, oil, and butter are substances possessed of very high nourishing properties; a less quantity of them sufficing to sustain life than of most other matters: yet we find that if an animal (a dog, for example,) be fed entirely on any of them, he will not survive many days. Nature, stimulated by continual superabundant nourishment, is exhausted, and sinks under disease. In estimating, therefore, the amount of aliment afforded by potatoes and grain, we should rather calculate according to the mass of vegetable matter capable of satisfying a full grown person. This subject is exceedingly curious, and might be illustrated at great length. I cannot, however, pursue it farther at present. I may merely add, in connection with what has been remarked, that potatoes, from some peculiarity in the mixture or degree of condensation in their nutritive matter, seem to possess an advantage over all grains as constant food. It is well known that potatoes and water alone, with common salt, can nourish men completely; we have hundreds of instances, in many parts of Ireland, where the people have lived constantly on this diet, from necessity; and yet have been as robust, healthy, and long-lived as persons fed plentifully on animal food. Now, I know of no mealy substance used as the general food of a nation, without being mixed with other kinds of alimentary matter, such as oil, fruits, whey, or milk. MacCulloch, in his work on the Western Islands of Scotland, makes some remarks which bear on this subject. "I have hinted," says he, "at the deficiency of food among the Highlanders. The introduction of the potato has done so much to remove this once prevalent cause of misery and depopulation, that such a want is scarcely suspected. It is, however, still apparent. At present, it is true, the Highlander rears a fair proportion of children, the average number varying between three and four. The children are also universally strong, ruddy, and handsome, yielding nothing in that respect to their better clothed and better lodged neighbors of the low country, or of England. This air of health and good feeding continues till the age of labor, and for some space beyond it. But, at twenty, or shortly after, an evident change takes place. The skin shrivels, the bones of the face project, and the marks of age, already perceptible, increase rapidly to that period in which it becomes sensible in the laboring part of the community every where. After that there is perhaps no further comparative difference; and the limit of the Highland laborer's life stands on a fair average with that of the Lowlander or Englishman. This change is most sensible in women. Instances of beauty are by no means uncommon in the female children: but it vanishes at seventeen; and, shortly after, the marks of age hasten on so rapidly, that (with deference to the Highland fair be it said,) they acquire the aspect so dreaded by Queen Elizabeth, or the ancient fair one recorded in the well known epigram of Plato. This effect seems to proceed from the insufficiency of the food compared to the labor; and, to those who have seen the country, I need hardly say, that an equal, if not the greater share of that labor, is often the lot of the females. There is reason to suspect, from the greater durability of the lower classes of the Irish, where potatoes form the sole food, that this

* Edinburgh Review, vol. xxxiv. p. 330.

root is superior, in its nutritive qualities, to oats or barley; and we may therefore slight the misplaced compassion of those who lament the hard fate of the Highlander in the Islands, where a sufficient supply of oatmeal cannot be procured, and where the inhabitants depend on the potato."*

Let me remark, in conclusion, that the potato seems to have been the only plant wanting to complete the agriculture of the British Islands. Vast portions of land, in all the three countries, are by no means fitted for the cultivation of grain; yet there the potato will flourish. It will thrive where no other esculent vegetable will grow, and has this grand advantage, that, in such situations, it can be grown at very small expense. It has also this superiority over all kinds of grain, that it is perfectly secure against those heavy late rains which so often destroy the hopes of the farmer. The potato has rendered us entirely independent of foreign nations for a supply of food, and placed us almost beyond the reach of those frightful famines, which, in former times, so often devastated the land. It furnishes a proof that a single vegetable, when its importance comes to be properly appreciated, may work an entire change in the habits, the enjoyments, and the fortunes of a people.

From the [London] Examiner.

EXTINCTION OF FIRES.

The safety of the inhabitants being ascertained, the first objects at a fire should be the exclusion of all fresh and the confinement of all burnt air—*suffocate* the flames—remember that burnt air is as great if not a greater enemy to combustion than even water; the one, till again mixed with oxygen, can never support flame; the other, especially if poured on heated metal, is converted into its elements, the one hydrogen, in itself most highly inflammable, the other oxygen, the food of fire. For both purposes, of excluding the one air and confining the other, all openings should be kept as carefully closed as possible—the prevailing practice of breaking the windows is peculiarly mischievous. The only excuse for this is the admission of water; but if the firemen were provided with proper self-supporting ladders (Gregory's, or any other, that need not lean against the walls,) they might direct their branches through a single broken pane with ten times more accuracy than by their random squirting from the street. Water should be made to beat out the fire by its impetus; aspersion is but useless. An attempt should always be made to stop up the chimney-pots; wet rags, blankets, or an old carpet, will serve this purpose, and thereby confine a considerable quantity of burnt air. The same materials, well wetted, should be freely used in covering the nearest roofs and windows; and, in order that water may be freely conveyed to the very tops of the neighboring houses, and for many other purposes, outriggers with ropes and pulleys should accompany the engine.

From the Monthly Magazine.

GAS.

The mode of adapting it to lighting our streets and houses, was discovered by a Frenchman, an engineer, named Lebon, about twenty-five years ago, who gives the following particulars of the circumstances which first led to its application. It was about 1663, that Becher, a skilful chemist, discovered that coal, when calcined in close vessels, yielded a kind of oil resembling tar, and capable of serving for the same uses. Experiments made in 1758, in Alsace, for the extraction of this oil, proved that the calcined coal left in the retort was of excellent quality for melting iron, and for all domestic purposes. In 1786, M. de Limbourg, having employed the same processes at the forges of Theuse, in the principality of Liege, substituted for earthen retorts, which till then had been made use of, retorts of cast iron, which are more durable, and in which an opening may be made, provided with a door for putting in and taking out the coal. These experiments were repeated with success in England and France. In the prosecution of them it was found that besides the solid and liquid products, there was disengaged an inflammable gas, composed of carbon and hydrogen, and which was therefore denominated *carburated hydrogen*. In 1799, Lebon conceived an idea of adapting this carburated hydrogen gas to a useful purpose, and realised it the same year at Paris, by exhibiting the interior of his house and garden illuminated with it, issuing from a large reservoir, where it underwent a slight compressure, and was conducted to the lamps by small tubs furnished with cocks, that could be opened at pleasure to light the gas, or closed to extinguish it. Lebon set up one of these apparatus, which he called thermo lamps, at the Theatre de Loervois, where every body had an opportunity of seeing it for several months. It was the very same apparatus now employed in England, but on a much larger scale. The only difference is, that Lebon obtained his gas by the calcination of *wood*, and the English from coal.

From the Horticultural Register.

ON ACCELERATING AND RETARDING THE MATURITY OF FRUITS AND VEGETABLES IN THE OPEN AIR.

Every gardener who supplies markets is aware that fruit and vegetables exposed for sale early in the season generally obtain higher prices than those brought when the bulk of the crop comes forward. Private gentlemen keeping gardeners are also equally alive to the luxury of having their tables spread with fruit and vegetables at least as early as they appear at market. It seems therefore a point of some importance to gardeners to seize every advantage which situation, the nature of the soil, or the experience of others offers to effect this purpose; and while I lay before the readers of the Register the result of my own experiments and observations, I earnestly solict from others, communications on a subject which opens a field of so much interest both to the intelligent observer of the laws of vegetable life, and to the practical horticulturist.

In one of the numbers of Loudon's Gardener's Magazine, I observed a method of obtaining early strawberries by planting them in intervals between bricks laid like a bank slanting towards the south; —pursuing this idea I raised a bank of rich earth about three feet high, running east and west, that

* Western Isles.

is, one side south, the other north; this I faced with the irregular masses of pudding stone which abound in this vicinity, leaving spaces in which I planted strawberries. My reasoning was, that the stones, by preventing evaporation, would keep the soil moist in which the roots grew, a state very favorable to the swelling and size of the fruit; that the heat of the sun imbibed by the masses of stone on the south side where the fruit lay, would ripen it earlier; particularly, being dry, they would not so soon cool as the earth, the evaporation from which produces considerable cold on the surface; that the berries reposing on the stone would be kept free from dirt during heavy showers; and lastly, that while the south side was earlier, the north would be somewhat retarded; and thus prolong the period of enjoying this wholesome fruit.

My expectations were however, only partly fulfilled. I had a good crop, very clean, some late, but not more than a dozen or two were in advance of my neighbors. On these results, I observe, that my bank although three feet high had no additional shelter by pailings or fence behind it, against the cold north winds, which prevailed far in the summer of 1834, and which certainly penetrated the north side, keeping the temperature of the earth round the roots of the south plants so low as to check advanced vegetation. Again, gardeners employed in forcing are aware that those plants alone are fit for their purpose which have gone earlier the preceding autumn into a state of rest; consequently, it is probable that with proper shelter, such a plantation would be some days earlier the second year than the first, the plants having gone sooner into the above state. I will mention that by the assistance of a few hand glasses and Russia mats, I have seen a south bank of strawberries, well protected by a wall, in fruit eight days earlier than the common crops.

The fruit of the strawberry plant may also be postponed by pinching off the flower buds, as soon as they can be discovered, but carefully, so as not to injure the leaves or the heart of the plant, until the second or third week in June, when they must be left to fruit, always destroying the shooting runners, and observing that in hot weather they must be plentifully supplied with water or the blossoms will shrivel and be steril; this is an easy task if the plan of a bank such as I have described is put in practice, because the ridge at the top can be made with a channel capable of being quickly filled with water, which will then gradually soak through the whole, without being rapidly evaporated at the surface.

With the deepest respect for Mr. Knight and other writers on the subject, for well their labors entitle them to this feeling from every cultivator—I am yet inclined to think that their expression of a state of rest for nature will prove something like that of the chemists of old, that "nature abhors a vacuum," and the industrious researches now in progress respecting the structure and uses of the various parts of plants will probably prove that nature does not require rest, but is, during this state of *hybernation* or wintering, in silent and invisible, but active preparation for the spring and summer campaign, when she will inundate the earth with her innumerable hosts of delicious fruits and flowers captivating and leading into sweet bondage all the dwellers thereon who come within reach of the beauty or incense of the latter, or the cool refreshing juices of the former. Similes are, however, little suitable to the tiller of the soil; he will find enough to puzzle him in the general classes of botany without meddling with the metaphoric class of flowers of composition.

The growers of seeds of culinary vegetables, might easily experiment on a small scale whether the seeds of plants forced one year would naturally vegetate earlier than those not forced, both being afterwards sown under exactly similar circumstances, observing that if it only made a difference of three or four days the first year, it might by forcing and management increase progressively the second year, and so on until by degrees this difference would at last become sensible. The same may be done with potato sets and many other plants.

If the first crop of peas were sown at the foot of a deep ridge formed by the plough facing the south, it appears to me that the young and tender shoots just rising from the earth, would receive considerable protection against the early north winds, as I have often found plants growing on the south side of a stone shoot and blossom earlier than the same plant on the other side; any one may observe in a piece of ground ridged by the plough or otherwise that the white frost appears on the upper edge and perhaps half way down, while the bottom of the trench has not been touched. This is perfectly in accordance with known principles in meteorology. I have tried the above method with complete success, but not in this vicinity. Every person conversant with peach trees, must know that there is a difference of a full fortnight in ripening fruit on the same tree, owing no doubt to aspect, original earlier vegetation of some blooms, shelter from or exposure to the sun; all these and many other circumstances may furnish ideas for experiment to the acute observer, and intelligent cultivator. It is not improbable that if the bloom buds, which are late, were rubbed off, previous to opening, those in a more advanced state, might be strengthened and forwarded. There remains indeed on this subject much scope for the application of ingenuity and industry, which I should be extremely glad to see in active operation. To delay the maturing of gooseberries and currants and to preserve the fruit in its natural state until September or October. I should recommend the selection of those trees most abundantly provided with berries; as soon as these have attained their full size and are just beginning to ripen, lay a clean Russia mat over the tree, gather it together round the stem about an inch from the ground and tie it firmly up with a string; the object being to shade it almost entirely from the rays of the sun, it would perhaps be as well for the first month or six weeks to put on a double mat, removing the upper one time enough for the autumnal sun to penetrate that underneath. I have eaten fine gooseberries preserved in this way only with a single mat as late as December in England, but that year no frost of consequence had then taken place; here I fear we cannot promise ourselves exemption so late, and frost would infallibly injure the flavor.

I have said little in this communication respecting hand glasses, or what are cheaper and nearly as good for mere protection during cold nights, frames covered with oiled white paper; these are easily made by sawing sugar boxes in halves hor-

izontally and fastening the paper in place of the top or bottom; they should be sunk an inch deep in the surface of the earth, and the crevices well stopped with putty. I trust that future communications will enable me to add information of a much more valuable nature on this interesting subject, than is offered to the public in the present paper, my principal object being to give an impulse to inquiries and experiment.

J. E T.

From the Wilmington Democrat.

DIFFERENCE OF WEIGHT AND VALUE IN PORK AND BACON.

We are disposed to think that practical knowledge on this subject would be highly acceptable to every intelligent farmer, especially when such knowledge is derived from a source entitled to implicit confidence. Dr. Wilson, of this county, from whom we obtained the subject matter of this article, assured us that he last season personally attended the weighing, salting, &c. of the hogs referred to below; and we have no doubt that similar experiments by other farmers will produce like results.

The following is the weight of four tolerably fat hogs about eighteen months old, after they were killed and well cleaned—

The 1st hog weighed	135	pounds.
2nd	140	
3rd	142	
4th	154	
Total weight,	571	pounds.

Hams of the four hogs weighed	128	pounds.
Shoulders,	147	
Middlings,	148	
	423	pounds.

Heads, feet, back bones, and leaf fat, 148 pounds.

The hams, shoulders, and middlings were salted, and in four weeks and three or four days, again weighed:

Hams,	125	pounds.
Shoulders,	143	
Middlings,	143	
	411	pounds.—Loss 12 lbs.

They were next well washed, hung up, and smoked two months and two weeks, and again weighed, after removing the adhering ashes.

Hams,	110	pounds.
Shoulders,	126	
Middlings,	126	
	362	lbs.–Additional loss 49 lbs.

So the 571 pounds of pork gave 362 pounds of bacon. Is it more profitable then to sell pork or make bacon of it? Suppose, for example, the Doctor had sold his pork at five dollars per hundred pounds.

571 lbs. at $5 per 100 lbs.—$28.55.

And suppose a speculator had bought, cured, and sold it, say only at 10 cents per pound.

This shows a difference in favor of making bacon, amounting to $7 65 from 571 lbs. of pork. Perhaps you'll say, "there's the expense of salting, smoking, interest, &c. which you would not have taken into the account." What! have you already forgot that we also omitted to say any thing about the heads, feet, back bones, and leaf fat, which weighed 148 pounds? And were not these amply sufficient to defray all the expenses attending the curing of the bacon? Another may hint that the publishing of such *experiments* will bring the consumers about our ears. Don't let them be alarmed—there's no *occasion*. Rather let them consult the matter and determine whether it would not always be to their advantage to purchase a supply of pork at Christmas to furnish a sufficiency of bacon throughout the ensuing year. Our farmers are generally too much prejudiced against what is called book farming, to profit by newspaper publications. We frequently quote weightier matters under agricultural heads, but they are usually passed over in such a manner that we are under no apprehensions that this article will induce any farmer to believe and act as though *selling his pork were not saving his bacon*.

From the Farmer and Gardener.

TO PRESERVE PEACH TREES FROM WORMS.

I have been a constant reader of the American Farmer from the time of its first publication, and frequently referred to it, in hopes of finding an effectual remedy against the attack of the worm on peach trees. I found at different times a number of publications upon the subject, and believe have tried the greater part of the remedies therein prescribed, without success. Finally, I concluded that the old method of cutting the worm out with a penknife, was the only one upon which any reliance could be placed, and have therefore been in the constant habit of preserving my trees in that way for years. I have, however, lately made an experiment, which I have every reason to believe, is quite as effectual, and attended with much less trouble. About a year ago, after I had gone the rounds, laid bare the roots, and cleared my trees of the worm, I took some fine screenings of Anthracite coal, and put about a quart or two to the roots of each tree; this was done to about the one half of my peach trees. Last fall I went round as usual to cut out the worms; those trees which had the Anthracite coal screenings about their roots, were without a single exception, clear of worms, the others had, as usual, a considerable number. I immediately applied the coal to the whole of my trees; and thus far, am well pleased with my prospects of success. I propose continuing the experiment another year, after which, I can speak with more certainty upon the subject; but the circumstance that half of the trees upon which the experiment was made, although situated precisely like the others, having been found clear of worms, when the others were full of them, is strong evidence in my mind that the remedy will prove effectual.

N.

Orwigsburg, 25th Jan. 1835.

From Loudon's Encyclopedia.

HAY MAKING—MANURE.

The art of making hay does not seem to be understood in the north of Lancashire or in Dumfriesshire any more now than it was in most parts of Scotland twenty-six years ago. The hay is put into cocks, which are left in the field till the outside by alternate rain or dew, and sunshine, is burned to a dusty woody matter, and the interior is rendered too dry to undergo the proper degree of fermentation when put in the rick. Indeed in Scotland the fermentation of hay in the rick did not use to be considered necessary, any more than the fermentation of the liquid food of pigs before giving it to them, or of liquid manure before applying it to the soil. Yet, though the Middlesex very superior mode of making hay does not appear to be yet prevalent in the north, we observed the bad Middlesex practice of dunging the meadows and grass lands with rotten stable dung, and composts of dung and lime, adopted in the park at Lowther Castle, and at several places near Lancaster. Mr. Ogilvie, an extensive Scotch farmer at Mere, near Knutsford, manures his grass land only with liquid manure, fermented in tanks in the Dutch manner, before being carted out; and this we consider to be by far the best, because by far the most economical, mode of manuring grass lands. The practice of forming compost heaps, by mixing quicklime with putrescent manure, or even with soil containing much vegetable matter, is contrary to all science, as was long ago shown by Lord Meadowbank. The lime is rendered much less fit for acting on the soil of the field, than when it was newly taken from the kiln; and the carbon of the dung, or organized matter in the heap, is rendered insoluble in water, and consequently unfit for being taken up by the roots of plants.

GEOLOGICAL SURVEY OF VIRGINIA.

Report from the Select Committee, to whom was referred certain Memorials from Morgan, Frederick and Shenandoah Counties, praying for a Geological Survey of the State, with a view to the discovery and developement of its geological and mineral resources.

The select committee, to whom was referred sundry petitions from the counties of Morgan, Frederick and Shenandoah, on the subject of a geological and chemical survey of the state, have had that subject under consideration, and respectfully report:

1. In looking to the example of other countries, as well as of several of our sister states, it would appear that great practical importance is attached to the geological and chemical inquiries which they have respectively instituted. In conjunction with extensive and minute topographical surveys, many of the governments of Europe have set on foot systematic and detailed inquiries into the geological features and mineral resources of their respective domains. France, Sweden, Russia, several of the German and Italian states, and Great Britain, have shown great activity in pushing forward these investigations. The latter government especially, has distinguished herself by the most liberal and steady zeal in developing those natural resources of the land, which form the basis of her wealth and power. The ordnance map of Great Britain, which is yet only in part published, and which, besides topographical, contains also *geological*, details, is looked upon as a signal proof of the liberal spirit and practical wisdom of the government of that country. In this country likewise, a growing conviction of the great importance of such inquiries, has led several of the states to make provision for extensive practical surveys, on a plan somewhat analogous to those conducted in Europe. The survey of Massachusetts, under the superintendence of Professor Hitchcock of Amherst college, has already been completed, and judging from the immense mass of details, under the head of economical geology, embodied in his comprehensive report recently published in a very large octavo volume, there can be no doubt that the community for whose benefit the survey was undertaken, has been amply gratified by the important discoveries it has brought to light, and the valuable practical bearings of most of its details. In this report, we behold a state possessing but little variety of geological features, displaying an amount and diversity of resources, (in part until now undiscovered, and never before arranged so as to be understood,) which cannot be contemplated without pride and satisfaction. Maryland and Tennessee are following the wise example of Massachusetts, and there is reason to believe that New Jersey, Pennsylvania and New York will, either during the present or the next year, authorize similar undertakings. In the preliminary report of Professor Ducatel of Maryland, will be found the most abundant evidence of the practical benefits which are to be anticipated from such researches. Though based upon a merely superficial reconnoissance of the state, this valuable document developes a number of interesting facts in its geology, of which little or nothing had been previously known, and from which new impulses to the enterprise of extensive districts of the state, may be confidently expected to proceed. The subsequent report recently presented to the legislature of Maryland, embodying all the details of the first year's operations in regular survey, has not yet reached us, but from what we learn, the developements which it contains are of a character to enlist the wisdom and patriotism of the state very warmly in the prosecution of the survey. Of the practical utility of the researches now in progress in Tennessee, the published reports and other documents relating to the subject, speak in the most unqualified and encouraging language. The labors of Professor Troost, to whom this survey has been committed, have already contributed a large amount of useful information relative to the mineral and agricultural resources of the soil of Tennessee. In the other states above alluded to, the adoption of similar measures for the investigation of their natural territorial resources, has been delayed from year to year by considerations of *economy*, to which the heavy debts accumulating in the prosecution of public improvements, have constrained them to defer. But no doubt appears to have existed of the real utility and highly important practical bearings of judiciously conducted geological and chemical surveys. Indeed, notwithstanding the heavy incumbrances under which some of those states are now laboring, projects of such surveys are at this time under

discussion in their legislatures; and there seems to be no doubt, that either now or at some early day, the necessary provisions will be made for commencing the investigations desired.

2. Witnessing the valuable results of these researches in Europe, and in some parts of the United States, we should of course anticipate similar benefits from inquiries of this nature conducted within our own territory. Nor would it be necessary, in order to feel convinced of the utility of such a survey as applied to Virginia, to refer in detail to those particulars in the physical character of the state, upon which it would bear with the most direct and prominent advantage. All are willing to admit the great extent and value and diversity of our mineral wealth, and at the same time to confess that its distribution through our territory, its precise boundaries in any one locality, its exact nature as ascertained by science, and its susceptibility of economical and profitable application to the purposes of commerce, manufactures, and the arts of life, are matters of which scarcely any thing as yet has been accurately determined. The mere surmises of ignorance on the imperfect observations of the inexperienced explorers who have examined without any adequate lights to direct their investigations, appear to have furnished nearly all the knowledge upon these points, of which we have as yet become possessed. To feel thus assured of the existence of a great variety of mineral riches within our territory, and at the same time, except in a few instances, to have availed ourselves of but little of the benefits it proffers, and to know but little of its position, nature or extent, are certainly in themselves powerful reasons for the adoption of some scheme of systematic, minute and extensive research. But, however obviously the advantages of such surveys might be inferred from these considerations, in connexion with the acknowledged benefits which other states have derived and are deriving from them, your committee have felt it incumbent to inquire more particularly into the specific bearing which inquiries of this nature would have upon all the great divisions of our territory. In attending to this point, a number of interesting particulars have come to their knowledge, some of which are perhaps not generally known, and all of which still further confirm them in the belief, that such a survey as the one in question, cannot fail to prove eminently advantageous to our state. Most of the facts here referred to, have been discovered by mere accident, and by persons seemingly unconscious of their importance; consequently, little or no improvement of them has been made, and no researches undertaken to ascertain their real extent or value. In adverting to the beneficial application of such a survey to the several great divisions of our territory, your committee feel at liberty to touch only on some of the more prominent particulars in which its utility would be felt: and, indeed, it is only in the actual progress, or at the completion of the investigation, that the most important of its practical bearings can be appreciated and understood. Discoveries of great general interest and of invaluable local importance, would, there is reason to believe, reward even the earlier efforts of those connected with the enterprise; and districts of the state, at present almost deserted from supposed meagreness of resources, would behold spread out beneath their soil, the rich earths, which were soon to diffuse fertility over their hills and plains, or the valuable rocks and ores from which enterprise was to derive new incentives to exertion.

3. Commencing with the tide-water portion of the state, your committee would remark, that the vast marine deposite of shells and other calcareous matters which underlie a great part of this region, may be considered practically, as well as in a scientific aspect, as one of the most important features in the geology of the state. The exhausted soils of many of the eastern counties, are already exhibiting the most astonishing proofs of the fertility which this calcareous matter is capable of bestowing, and it may be confidently expected, that when a more extensive and systematic attention to the employment of this manure shall have been adopted throughout eastern Virginia, a degree of agricultural wealth and prosperity will be realized, of which a few years since, or even at this time, it would be difficult to conceive. To the rapid, general and successful extension of this ameliorating system, there can be no doubt that a geological and chemical examination, extended to all the eastern counties, would be in a high degree conducive: in most of them marl has already been discovered: cliffs of it appear on all our rivers, and sometimes for miles, an uninterrupted bed of this precious manure forms one or both of the confines of the stream. But of the composition of its numerous varieties, of the districts which they severally occupy, and of the value of the various earths with which they are associated, but little general or systematic knowledge has been acquired. To one individual, the able editor of the Farmers' Register, the state is indebted for nearly all that has been done on the subject. But how important would it be to investigate the extent and character of this deposite more minutely; to trace it upwards from its first appearance near the mouths of our rivers; then, by transverse lines, to explore all the counties in its range, and at each step of the investigation to ascertain its agricultural value by chemical analysis.

Within the tide-water district also, but in a region to which the common marl does not generally extend, another deposite of even higher fertilizing properties than the former has recently been discovered. This substance, called green sand, from its consisting of granular particles of a green aspect when dry, is geologically an *older deposite* than that which embodies the ordinary shell marl. In the beds of the latter, however, in many situations, a very large per centage of the green sand has been discovered, and the value of the marl is believed to be much increased by the presence of this ingredient. The extent of this immense green sand deposite is yet conjectural, but that it reaches, with perhaps no interruption, from the Potomac to the Roanoke, may be confidently asserted. It shows itself on our rivers at a distance varying from a few miles to 20 or 30 from the head of tide, and it may be interesting to remark that the geologist of Maryland, guided by the experience of those who ascertained its existence in Virginia, has recently discovered a continuation of the deposite throughout the neighboring state. Of its relative value in the different localities, nothing is yet known; respecting the depth and breadth of the deposite, scarcely any thing has been ascertained. Here then would be an impor-

tant field of geological and chemical inquiry, and one in which the agriculture of lower Virginia could not fail to be deeply interested.

Associated with this deposite, and generally forming the superior stratum, is an extensive formation of selenite or gypsum. Whether this be an invariable attendant of the green sand, is of course undetermined, since of that deposite so little is yet known—but so far as observation has yet extended, it would seem to be a general associate of the green sand, specimens from the Potomac, Rappahannock, Pamunkey, and James Rivers, agreeing in containing some portions of gypsum.

In this region too, a variety of clays suitable to different species of pottery, are known to exist, an examination of which would doubtless lead to the introduction or extension of an important branch of industry. *Alum earth* and *copperas earth*, of which immense quantities are found in Maryland, and applied to the manufacture of alum and green vitriol, exist also in this part of our state, and probably in great abundance. Bog iron ore, one of the most valuable of all the ores of that metal, would also be met with extensively. Bordering on this region, at its upper limit, a variety of valuable products might be expected. In the south especially, the *secondary* rocks immediately adjacent to the *granite* ledge, would be deserving of particular attention. In this vicinity might be anticipated a third deposite of fertilizing marl, identical in position with the gunpowder marl of New Jersey. A stratum of magnesia earth has, within a few years, been discovered at one point along this line—and it is not improbable that its value, either in agriculture or in the manufacture of epsom salts, may lead hereafter to its profitable employment. Chemical examination would determine the value of these various matters, and new incentives might thus be given to the manufacturing enterprise of this portion of the state. The several varieties of water furnished by springs and wells would also form a subject interesting to health, and in other respects practically useful.

4. The space extending from the granite ledge to the Blue Ridge, embracing all the varieties of primary rock, containing the yet imperfectly traced gold region, the bituminous coal fields, and a vast variety of other mineral wealth, is next to be considered. Here, to trace out the gold region entirely through the state, would be an important and useful work. From what is already known of this deposite, there is every reason to augur its great extent and value. Indications of this metal have been found even in Goochland, and at other points far removed from the supposed line of the formation. A systematic inquiry on the subject would evidently result in much practical advantage, not only by opening up new discoveries, but by preventing those ruinous expenditures which are occasionally incurred for want of the proper guides to inquiry and research. The coal fields of Goochland, Chesterfield and Powhatan, from which eastern Virginia has already reaped so many benefits, would present a most interesting subject of geological examination. To ascertain the dips and convolutions of the various strata overlying and subjacent to the coal, and to investigate more attentively than has yet been done, the line of out crop connected with the coal, might lead to discoveries of no small importance to the prosperity of the state. That the real extent of those coal beds is not yet accurately known, is evident from the discovery of indications of this mineral in situations at some distance from any of the workings; for instance, on the line of the contemplated Richmond and Fredericksburg Rail Road.

In Prince Edward too, bituminous coal is found, and there is reason to believe that the seam from which the specimens have been derived, forms part of a very extensive basin of this mineral. Nor is it improbable that between the Richmond and Prince Edward deposites, and in the same geological range towards the north, this valuable mineral might be brought to light. Among the granite and feldspar of the region we are now considering, valuable deposites of procelain clay are already indicated. A stratum of this substance is known to exist in the vicinity of Charlottesville, and specimens have recently been obtained from a bed in Goochland, which in appearance, give promise of considerable value. That this earth will be found in many places throughout the region referred to, there can be no doubt. The rock feldspar, from which it is produced by the slow action of the elements, is an important constituent of our granite, and exists in some places in a separate mass. It is with this rock that the earth is mingled in certain proportions in the fabrication of porcelain; and the very beautiful material of this nature, now so successfully manufactured in Philadelphia, is formed of the clay and feldspar procured in the vicinity of that city and Wilmington, localities in the same geological range with the region in our state to which we now refer.

In this region too, will be found valuable beds of iron ore of various kinds, some of which are already known and wrought. Serpentine and magnesian rocks also occur, in connexion with which the valuable ore from which chrome yellow is manufactured, may be expected to exist. In the vicinity of the South-west and Buffalo Mountains, on both sides, a variety of important minerals are embedded. The shale of this ridge in Amherst and other places, yields, by the action of the atmosphere, great quantities of green vitriol, which impregnating the water as it filters through the rock, gives rise to some of the most powerful chalybeate springs in the United States. To the east of this ridge a belt of blue limestone appears, which would seem to be a continuation of the Potomac marble. From the continuity of this narrow vein through Maryland, high up into Pennsylvania, it would appear to constitute a very important feature in the geology of this district. It crosses the Potomac, and rises in one or two places before it appears very distinctly at Everettsville, and then shows itself very abundantly in Amherst, where it is associated with marble of superior quality. On the eastern side of this belt, is a large vein of flint, which experience shows to be equal to the common gun flint. Copper occurs very abundantly on the west side of the Buffalo ridge, and would probably be found interruptedly in the same range throughout the state. In the continuation of this line, it is found abundantly in Maryland, associated with iron and manganese. These metals would appear to be associated with it in Amherst. The vein of copper in this county

was largely worked prior to the revolution, and the impression prevails that a valuable per centage of gold is contained in the ore. Such is the fact in regard to a copper ore which is now wrought in New Jersey, and analysis might be usefully directed to this point with reference to the Virginia ore. The particulars here stated are only a few of what might be gleaned from the personal observations of intelligent farmers or scientific tourists, who have paid attention to the geology of this region, but they are abundantly sufficient, in the mind of your committee, to evince the advantages which this section of the state would derive from systematic geological and chemical inquiry.

5. The valley of Virginia would offer a multitude of valuable discoveries, and among them extensive beds of coal would certainly be numbered. The anthracite recently discovered in the counties of Berkeley, Augusta and Morgan, and the extensive mines of bituminous coal of Hampshire, indicate what may be anticipated from minute and judicious research. If we look to the inexhaustible deposites of this precious mineral, which the enterprise of Pennsylvania has brought to light, and with which, perhaps, more than any other of her vast mineral resources, she is now building up the permanent fabric of her wealth and power, with what satisfaction should we welcome a discovery which properly improved, may lead to an equally enviable condition of prosperity in one of the loveliest and richest sections of our state. In this region, the noble ranges of the North and Warm Spring Mountains, with their numerous subsidiaries, would furnish an almost unexplored field to the geologist. Valuable metallic ores, in addition to those already discovered, and new medicinal springs, would here reward his labors. The sandstones, limestones, slates and marbles, yet reposing unbroken in the hills, would all be subjects of interesting observation. He would examine also the rich saline deposite of the caves, and gypsum with which it is sometimes abundantly associated. The beautiful and copious fountains in the Warm Spring Valley, including the Warm, Hot, Sweet, Alum, and other springs, would claim his scientific scrutiny. The other waters, such as those of Bath in Morgan county, and Augusta, would also be examined. These and a variety of other objects to which geological and chemical inquiry might be profitably directed in this region, have an importance which must give peculiar interest to the prosecution of such researches in the great valley of Virginia.

6. Beyond the Alleghany we behold a region of almost unparallelled natural riches. Here we have the vast bituminous coal formation of the west, as extensively displayed as in Pennsylvania; and in addition, salines and a gypseous formation with which even New York cannot compete. The immense strata of this region, sweeping with a gentle inclination from the mountains, extend far west, until they reach the Mississippi in nearly horizontal planes. The ocean that once rested on this vast tract, besides the legible impressions of his former sway, visible in almost every rock, has left deep in the earth, and in some places extending to its surface, the rice treasures of salt with which his waves were once freighted. In some places, as at Abingdon, this saline matter would appear to exist beneath in massive form. Amid the spurs of the Alleghanies are abundant evidences of coal: metallic ores, among which may be enumerated lead and iron, are also found in this western region. Here, too, are poured out many of those healing waters to which crowds of invalids now annually resort. In a word, this portion of the state teems with matters of interesting inquiry. Yet it is only at a few points that its treasures have been opened up, and but little certain is yet known of their relative arrangement, of their extent, or their comparative value. This vast territory is destined by its mineral riches alone to become at some future day, one of the most prosperous and wealthy districts of the state, and no part of Virginia is more deeply interested in procuring a geological survey.

7. Besides the numerous points of inquiry alluded to in the above brief review of our territory, there is one investigation which would be applicable to all sections of the state, and which would undoubtedly contribute to the general benefit of our agriculture. We refer to a systematic analysis of all the important varieties of soil within the state. This would be a work of great labor, but would unquestionably repay the state one thousand fold.

8. Keeping permanently in view the peculiar practical bearings by which such a survey should be directed, a proper attention should also be paid to those general and scientific relations, which the progress of the investigation would disclose. In many instances, the generalizations of science would be found of great utility in guiding observation; and the determination of many interesting questions of a purely scientific nature, would be incidental to the practical researches of the geological and chemical inquirer. The relative ages of all the great formations of the state, might eventually be made out; the periods at which disturbing causes, at many points, broke up and contorted the stratification, and the relations of the various agencies which have formerly been in operation in our territory to those now in action, both as to quantity and kind, would all be elucidated in the progress of the survey. The geologists of Europe, are so well aware of the interest that attaches to this portion of the United States, on account of the diversity and extent of its formations, that they are, at this moment, looking with impatient anxiety for some systematic effort to unfold its true physical character, and to bring fully to light the treasures that lie hidden beneath its surface.

In the execution of the proposed geological and chemical survey, your committee would observe, in conclusion, that the most advisable plan would seem to be, to divide it into two parts: namely, 1st. A geological reconnoissance of the state, with a view to the general geological features of our territory, and to the chemical composition of its soils, minerals and mineral waters: and, 2d. A detailed geological survey of the various sections of the state. The first part of the plan would possess of itself a separate and independent value, would be attended with but little expense, and would furnish to a succeeding legislature, the most satisfactory means of estimating the value of a detailed survey, and of deciding or pausing at the point to which we should then have attained, or of proceeding directly to the execution of the entire scheme.

In conformity to these views, and with the object of advancing directly to the accomplishment

of the first part of the plan, your committee beg leave, respectfully, to report the accompanying bill.

AN ACT TO AUTHORIZE A GEOLOGICAL RECONNOISSANCE OF THE STATE, WITH A VIEW TO THE CHEMICAL COMPOSITION OF ITS SOILS, MINERALS, AND MINERAL WATERS.

[As amended from the bill reported by the committee, and passed by the General Assembly of Virginia.]

Be it enacted by the General Assembly, That as soon after the passage of this act as it may be convenient, it shall be the duty of the board of public works to appoint a suitable person to make a geological reconnoissance of the state, with a view to the general geological features of our territory, and to the chemical composition of its soils, minerals and mineral waters, and to report to the next General Assembly a plan for the prosecution of a geological survey of the state, together with such facts as may have come to his knowledge during the progress of said reconnoissance, illustrative of any advantages likely to accrue from a more complete examination.

Be it further enacted, That the said board of public works shall have authority to allow to the geologist who may be employed under the provisions of this act, such compensation as they may deem reasonable to be paid out of any unexpended moneys in the treasury: *Provided*, that such compensation shall not exceed the sum of fifteen hundred dollars.

This act shall commence and be in force from the passing thereof.

From the New York Farmer.

AMERICAN FILBERTS.

We have laying before us some as fine filberts as we ever saw, raised at Lansingburgh, in this state, by Mr. Walsh. Mr. W. says, the season was not favorable, and that these are smaller in size than some he raised before; but, they are nevertheless excellent in quality, and, even as to size, larger than the average of the imported nuts.

The above is copied from the New-York American. Large quantities of these nuts are imported. Mr. W. is fully of the opinion that our climate will ensure their fruitful growth. He has cultivated them for several years.

From the New England Cultivator.

CLOVER.

Clover will grow on pretty much all soils that have been laid dry by good drains. It is the basis of good farming, on all lands susceptible of alternate husbandry. Its benefits are three-fold: it breaks, pulverizes and ameliorates the soil by its tap roots, and it furnishes a cheap food for plants as well as animals. A good clover lay is worth to a crop, by the food which it affords, as much as five tons of manure to the acre. To ensure a good lay, at least ten pounds of seed should be sown to the acre, and the ground well rolled. Its value, as food for plants, depends more upon the quantity of roots than upon the luxuriance of the stems, though the abundance of the latter will depend in a great measure upon the number of the former. To obtain the full value of this plant, we must cultivate it as a food for our *crops*, as well as our cattle; and in this case we should use it as such the first or second year, before it has run out. There is economy in always sowing clover with small grains, though it is to be ploughed in the same or the next season. Ten pounds of seed costs upon an average one dollar—the labor of sowing is comparatively nothing. Its value to the next crop cannot be less than quadruple that sum, to say nothing of the feed it may afford, or its mechanical amelioration of the soil.

STONE FENCES—ASHES AND GYPSUM—LIME.

To the Editor of the Farmers' Register.

Frederick County, Feb. 23, 1835.

At the request of a Querist in the last No. of your Register, I take the liberty of sending you for publication, the following remarks.

Round stones being indifferent materials for making stone fences, they should be worked with care and attention in building the fence—they should be disposed of in the fence as cannon shot are usually stacked up, so as to be made to press as much as possible to the centre. The base and sides of the fence should form nearly an equilateral triangle, so that a transverse section of it would represent such a triangle. The length of the base line will of course depend on the height of the fence, which should not be too great, otherwise it may slip down; nor would any height prevent some kinds of stock from running over its inclined sides. This kind of stone fence is best adapted to underpin stab, post and rail, or plank fences—to which it is admirably suited—and may be of any height that such fences may require, giving it always the angle above mentioned. It is not necessary to dig a foundation in the earth for it, which may prove injurious, by forming a receptacle for the water, which would otherwise run off, instead of settling in the fence, and sapping its foundation.

A mixture of drawn ashes with plaster when sown, renders the operation less distressing to the laborers, whose eyes are apt to be incommoded by the flying of it. It also enables them to strew it more equally, regardless of the wind, which often interrupts the operation, when sown alone. The quantity used will depend mostly on the quantity at command; for persons having more than will afford an equal portion for the plaster, it is usual to mix half and half, and to sow about a bushel of the compound to the acre, or more, as the farmer may choose, depending on the situation of his land, whether it has been plastered before, or not, &c. With the plaster and ashes may also be mixed clover, or other grass seeds, in any proportion desired, when the whole operation can be performed at the same time.

The beneficial effect of lime as a manure is so generally admitted, that, to deny its operation in any instance, is hazarding the charge of skepticism; nevertheless, there are cases in which the zealous farmer is sadly disappointed in the result. Whether it be owing to the soil in a limestone region of country, being already saturated with lime, so as to effervesce strongly with acids, or to some deleterious quality of it, as magnesia, &c., the re-

sult is often different from the generally received opinion. Lime should therefore be used experimentally: at first in small quantities, to see what effect it has, and increased afterwards as the result indicates it should be. It is unnecessary as an adjunct to putrescent manures, in the first instance, whose softer parts will easily decompose without it; but should it not be used as an alternate manuring to succeeding crops, to dissolve the coarse parts of vegetables, which will not easily dissolve of themselves?

GENERAL ACCOUNT OF THE VINE, AND ITS CULTURE IN THE ENVIRONS OF PARIS.

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francaise*, for October 1834.

[The following translation of a very recent account of vine culture and management, is offered under the belief that most of the vine cultivators in this country will be pleased to know what is the most approved practice at this time in a region very unlike their own, and where the culture has been brought to a high degree of perfection, under a climate, too cold to be favorable. It has been long settled that the close pruning practiced in France will not answer here—and probably other parts of the practices of that country are as unfit to be introduced into this: but nevertheless, something may be gained from the opinions and practices of others engaged in like pursuits, in situations the most remote, and under circumstances the most opposed to our own. The directions for training vines on walls *(en espalier)* may be useful as well as interesting to many in towns, where ground is scarce and dear, and brick walls are in plenty, and cost nothing.

The lists of the various kinds of grapes are given in the original language—because consisting almost entirely of names, and the very concise descriptions annexed containing so many technical words, a translation would scarcely fail to be incorrect, and therefore, probably of less use than the lists in French. As presented here, the lists may be, to French readers, useful—and their entire omission will be no injury to the remainder of the article.]

The vine, *vitis vinifera* [Linnæus] is a native of the forests of Persia: the Phocœans brought it to Marsailles, whence its culture was spread into the Gauls. The emperor Julian says, in his *Misopogon*, written in the year 360, that he made very good wine in his dear Lutetia, which was then within the isle of the city [of Paris].

The vine remains low in cold and temperate countries; in warm countries it grows up to the tops of the highest trees. Its culture has now extended into all temperate situations. It does not produce good fruit in the very hot climates of the tropics, nor in cold or frozen regions, that is to say, above 40 or 52 degrees of latitude. France, Spain, Portugal, Italy, Styria, Austria, Carinthia, Hungary, Transylvania, and Greece, furnish the best vineyards in Europe. Besides this quarter of the globe we may mention Cyprus, Madeira, the Canaries, the Azores, and the Cape of Good Hope.

Of all countries, France is one of those which produce wines of the best quality, and capable of the longest preservation; here are now cultivated yearly more than 800,000 hectares of land in vines, the grapes of which, converted into wines yield an annual product of 761,270,000 francs.

Like most valuable plants, the vine has produced by cultivation many varieties, some for the table, and others for making wine.

1°. *Variétés pour la table cultivées à Paris et ailleurs.*

1°. *Morillon hâtif* ou *raisin précoce de la Madeleine.* Feuilles palmées, alternes, incisées, petites; grappes petites; grains violets, noirs ou blancs; peau dure; très précoce. Il se plaît au midi.

2°. *Chasselas de Fontainebleau* ou, mieux, de *Thomery.* Grappes à gros grains, peu serrés. Il y a le noir, le violet, le rouge, le rose, le blanc et le hâtif. C'est le plus cultivé pour la table comme étant le meilleur.

3°. *Chasselas doré, bar-sur-aube* ou *raisin de Champagne.* Feuilles laciniées, grandes bien avant; grappes grandes et grosses; grains d'inégales grosseurs, fondans et sucrés. Il mûrit très bien dans le rayon de Paris. Il faudrait, pour qu'il n'arrivât pas en maturité, que les automnes fussent froides. Très cultivé. Situation à l'est.

4°. *Chasselas musqué.* Feuilles de moyenne grandeur, peu découpées; grappes assez grosses, sucrées. Tardif.

5°. *Muscat noir.* Feuilles peu découpées; grappes d'un violet noir sucrées.

6°. *Cioutat* ou *raisin d'Autriche.* Feuilles incisées; grains petits. Exposition au midi.

7°. *Muscat blanc de Frontignan.* Feuilles peu incisées; grappes coniques; grains serrés, fort sucrés et un peu musqués. Très bon raisin. Au midi.

8°. *Muscat rouge.* Feuilles découpées; grains d'un rouge vif ou marbré de jaune ou de rouge pâle, sucrés et musqués. Mûrit bien.

9°. *Muscat d'Alexandrie* ou *galle longue musquée.* Feuilles dentées, incisées; grains ovales, musqués et de la grosseur d'un œuf de pigeon. Au midi.

10°. *Cornichon blanc.* Feuilles grandes, peu découpées, cotonneuses; grappes allongées et grains sucrés en forme de petit cornichon. Très bon raisin, mûrit très bien à Paris.

11°. *Verdal.* Grains à peau mince, sucrés. Au midi.

12°. *Cornichon violet.* Grains sans pepins jaunes. Exposition très chaude.

13°. *Vigne de Ténériffe.* Nouvelle varieté; grains ovoïdes, et d'un violet foncé très clair. Mûrit en septembre.

14°. *Vigne d'Ischia.* Nouvelle variété donnant deux récoltes par an dans le midi.

15°. *Raisin de Corinthe.* Grappes bien fournies et allongées; grains ronds, petits, sans pepins et sucrés. Exposition très chaude ou, mieux, mettre la serre portative devant le treillage.

16°. *Verjus, gouais* ou *bordelais.* Feuilles grandes, fort découpées; grappes grosses; grains ovales ou oblongs, noirs, rouges ou jaunes, sucrés.

17°. *Saint-Pierre.* Grains ronds, blancs et gros.

On taille les deux derniers à cinq yeux: on les consomme en confitures, et on en exprime le suc nommé *verjus.*

Telles sont les variétés pour la table: on les plante au pied des murs sous le chaperon; on les

plante aussi au milieu des jardins et dans les champs, mais alors on les échalasse.

II. *Variéteé pour faire le vin, cultivées aux environs de Paris, dans le milieu des jardins et des champs.*

Le meunier, le morillon, le murlot ou languedoc, le plant du Roi ou bourguignon, la feuille ronde ou bourguignon blanc, le meslier, le manzard, la rochelle noire et blonde, les muscats, le gris-mêlé, le petit-goy, le sansmorillo, le gamet, l'ericé, le gouet bleu et le gouet rouge: ces deux derniers tournent au gras: on les mêle avec d'autres vins pour qu'ils se conservent: on y cultive aussi le petit muscadet ou pineau gris, qui est une variété mixte.

Il serait fort long de faire l'appel de toutes les variétés préférées et cultivées dans chaque département où la culture réussit le mieux: je ne parlerai que de celles qui donnent les meilleurs vins.

D'après Bosc, on cultive dans le département de l'Yonne, à Auxerre, Migraine, Tonnerre, Chablis, Joigny, Cussy, Coulange, Sens, Avalon, etc., les variétés suivantes: le pineau noir, blanc et gris, le plant vert, le tresseau, le romain, le plant d'Orléans ou teinturier, le pineau de Collonges et le gamet.

Dans le Bas-Rhin, à Weissembourg, le rouge ordinaire, le rouge de Bourgogne, le rouge de Lamberlsloch, le treutsch, le kleinhengot, le schoemberg, le dreymoener et le roesling.

Dans le département du Jura: le raisin perlé le pineau ou franc morillon, le petit baclan, le tresseau, le meunier, le petit gamet, le muscat noir, le sauvignon, le savagnin, le fromenteau gris, le chasselas et le raisin dit la faucille ronde. Il faut voir le mémoire de M. Dauphin, 40e volume des *Annales d'agriculture.*

En Provence, sur les côtes de la mer: le manosquen ou teoulier, l'union noire, l'olivette noire, le plant d'Arles, le brun fourca et le petit brun.

En Provence, dans la plaine: le catalan, le morvèbre, le bouteillan et l'union rouge.

Tous les vins de Provence, foulés séparément, produisent des vins particuliers très bons. M. *Julia de Fontanelle* a donné un fort bon mémoire sur les variétés et autres vignes que l'on cultive dans le midi de la France; ce mémoire est imprimé dans la *Bibliothèque physico-économique* et dans le *Journal de chimie.* M. *Antoine David* mérite aussi d'ètre lu: son mémoire se trouve chez Madame Huzard, rue de l'Eperon, á Paris.

Dans le département du Gard, 1° dans la Vannage: l'alicante, l'espar, l'ulliade, le piquepoule hâtif, l'ugne, le calitor, le moutan, le spiran, le terré, le maroquin, le muscat rouge, le piquepoule-bourret tardif, le terré-bourret, la clairette et la madeleine; 2° à Saint-Gilles: l'espart, le granache, le terré, le moureou, la rullade, la clairette, le picarnaud et le gallet; 3° aux côtes du Rhône: le piquepoule, le terré, le pétarcou, le moutardiers, le marquins et la granache.

Variétés les meilleures, d'après Bosc, que l'on cultive dans la pépinière du Luxembourg et les pays où ils prospèrent le plus.

Le bérardi (Vaucluse.)
Le dolceto (Pò.)
L'épicior petit (Vienne.)
Le luisant vert (Doubs.)
Le pied-de-perdrix (Hautes-Pyrénées.)
Le trousseau (Jura.)
Le pineau de Bourgogne (Côte-d'Or.)
Le franc pineau et pineau noir (Seine-et-Marne.)
Le meunier (Paris.)

Il y a encore des variétés particulières à bien des localités qu'il serait trop long de rapporter: elles sont décrites par MM. *Rozier, Duhamel, Gorcy, Noisette,* etc.

Greater success is always obtained from varieties cultivated in the north and transported into the south, than from those of the south transported into the north, because the varieties of the north ripen more surely in the south, than those of the south do in the north.

All the varieties delight in calcareous, sandy, flinty or rocky soils; in granitic sands mixed with vegetable earths, in volcanic earths, and finally in all dry, warm and light lands, lying on slopes, and reflecting heat; they also require an exposure to the sun and wind, and towards the south. Under these circumstances, in all places, are obtained the most delicate and richest grapes and wines; they are but of middling quality in shaded situations as well as in very stiff lands, and are not produced at all in watery soils.

The vine is propagated from the berries, from slips, layers, and grafts.

1st. *Propagation from the seeds.* This method produces the varieties which best resist frost. The seeds are sown in March on the open ground or in earthen pots; the sowing is covered with straw after the seeds have been covered with the earth of the surface, or, if it is preferred, after having covered the seed-bed with a layer of mould or fine earth The seed comes up in ten days. In winter the beds are covered with straw the first year, that the frost may not injure them; the plants are set out the second or third year; the land which is to receive them is broken up to the depth of seven decimetres (two feet) if the vegetable earth is as deep. This method of propagation is very slow and very little used, because no fruit is gathered till the third or fourth year, and it is only by the fruit that it can be known whether the grape is good or bad. In this uncertainty, the other modes are preferred.

2d. *Propagation from slips.* There are two sorts of slips: the slip *en crossette,* (that is, with a portion of older wood attached to it,) and the simple slip.

a. Slip en crossette. This slip is made of the lower part of the water sprouts furnished with five or six eyes and three centimetres (one inch) of two year old wood detached from the branch of the mother vines, well filled with sap. These slips are cut in October or at the time of pruning: if they are cut in autumn they are kept buried in moist earth until they are planted. The time of planting having arrived, that is in March, the slips are cut at from four to six millimetres (two or three lines) with a keen edged knife, upwards and above a good eye, and they are planted in dry soils; this operation is postponed till April if the land is a little wet. In the south of France this planting is done in autumn, as soon as the slips are taken from the vines.

The distance at which the plants are placed from each other, in the north and in the south of France varies according to the fertility and temperature: it is necessary that they should be sufficiently far

apart that the roots may draw nourishment from the adjacent earth without injuring the neighboring plants, and that the air and light may reach them and circulate without obstacle. At Paris the slips are planted in the fields, up to the last eye but one, at the distance of sixty centimetres (two feet;) in the south of France they are planted at ninety centimetres (three feet;) the whole plantation is covered with straw that the sun may not dry the land, it is watered, and the watering continued as required. If it can be done, these slips *en crossettes* should be taken from poorer lands than those in which it is intended to plant them, because then the impulse of vegetation will make them take root quicker and better. The ground must have been broken up beforehand, if it was not in good tilth, and also enriched with mould if it was not sufficiently fertile. At Paris, forward vines are always preferable, that the grapes may ripen: for if many of the varieties which are cultivated do not reach maturity at Paris, it is because the climate is not sufficiently warm.

The ground is worked a second time and weeded when it becomes grassy. The slips which cannot support themselves are propped up.

b. Simple slips. A more economical way, says Thoüin,* is to plant simple slips, well filled with sap, nine months old, and of the preceding year's growth: but the produce is slower and less sure, for this reason the slips *en crossettes* should be always preferred.

3d. *Propagation by layers.* This method is employed to invigorate old vines, to replace those that are dead, and to procure well rooted plants. In March at Paris, and in the south of France in October and November, says Thoüin, they commence by laying bare the roots of the stocks from three to five decimetres (nine to fifteen inches) deep, and twice as much in diameter. The most vigorous branches are chosen, sufficiently distant from one another to be laid down without confusion, the twigs are stripped off from the part which is to be laid down; afterwards the intended branches are placed in the opening, they are fastened down with a wooden fork that they may not get out of place, and their ends are set up nearly perpendicularly on the exterior edge of the hole; the layers are cut off at one or two eyes above the level of the earth. The hole is not completely filled up, that the roots may draw up their juices from a greater depth in the earth, and that the atmospheric moisture may remain and refresh the layers. A prop is set up behind each layer to train it up as it grows. Grass and weeds, as they appear, are removed with the *binette*, which breaking up the land, renders it at the same time more permeable to atmospherical agents.

In the autumn of the year of this operation, or in the spring following, the layers are separated from the stocks, or left untouched; they have taken root sufficiently to support themselves, but it is better not to separate them. This means of propagation is much used in Burgundy, Lorraine, &c.

If it is wished to have grapes on the table in November, layers are made of the branches of vines of the year, which are in pots, by passing them through the holes of the pots which are filled up with earth. The leaves must be taken off the part to be buried, and four or five eyes must be above the earth; the layer is taken off when well rooted. These pots may be put upon the table the following year when the grapes are ripe.

4th. *Propagation by grafts.* The vine is grafted in two ways, in a cleft upon the stock, and in a cleft under the crown of the root.

a. Grafting in a cleft upon the stock. This is performed in April on the stock, pretty near to the ground. The stock is split perpendicularly in the middle to the length of six centimetres (two inches,) and the graft, fourteen centimetres (five inches) long, cut into the form of a wedge is introduced and sunk well into the cleft, making the bark of each coincide perfectly, according to M. Poiteau."* The late M. Thoüin† says, that this coincidence is not of absolute necessity, because the sap rises by vessels dispersed in the woody substance. A mould of clay is put around the graft, when the ligatures form knots, they are loosened, and the juncture being well secured, the clay is re-applied. Props are set, the shoots which come out below the graft are cut off, and the ground receives a second working with the *binette*.

b. Grafting in a cleft under the crown of the root. This grafting is made by laying the root bare to fifteen centrimetres (six inches) below the first small roots, a perpendicular cleft is made and the graft placed in it, this last is surrounded with a band of rushes and grafting wax. Thoüin says that not five in a hundred of these grafts will fail, and that the stocks furnish many grapes even in the second year, by pruning to five eyes. This is a method of turning to profit good stocks which bear bad fruit.

Thoüin justly complained that enough use was not made of this way of grafting in cultivation on a large scale, it is, nevertheless, an excellent mode to renew vines while improving the nature of grapes.

Pruning vines en espalier [trained against walls] *at Paris.* Vines are pruned in February, if there is no frost, and not earlier. It is no longer considered good practice to prune vines or trees in the months of December and January; the least frost having affected the whole opening, would attack the wound made by pruning, would first destroy the extremity of the branch, and thus affecting the adjacent bud, would injure it. Skilful cultivators‡ recommend that there should be no pruning till, all danger from frost being over, and the sap ready to move, the succeeding vegetation may either repair the nudity produced by the chisel, or cover the incision made by the pruning knife. Columella§ knew this, and advised that vines should be pruned in the spring in cold climates, because they produced more grapes, and that they should be pruned in autumn in warm countries.

The stocks planted are cut down, the first year, to two eyes; the second year they cut off all the shoots from the bottom, only the strongest and straightest is reserved of which the main stock is formed—this is cut down to three decimetres (nine

*Cours de culture des végétaux.

* Le bon jardinier.

† Cours de culture et de naturalisation des végétaux.

‡ Thoüin, Noisette, Oscar, Leclerc.

§ Economie rurale liv. IV. chap. X. et chap. XXIII.

inches) in height, only three eyes on its upper part are left, and all those below are rubbed off; the uppermost of these eyes is destined to furnish the shoot which is to continue the vertical stock, and the two lateral eyes to produce the first two mother branches of the bottom of the vine. They train the shoots as they grow in the directions they are to keep, the two lower are led as much as possible to opposite directions, and the upper placed perpendicularly on its base. The eyes which produce shoots are rubbed off.

At the second pruning the perpendicular stem is cut down to six or eight eyes, and the two lateral shoots to four or six; on the former only the upper shoots are left, and on the two others, only the two eyes which are below each cutting; all the rest are rubbed off. The three eyes of the vertical stem are intended to supply the second lateral range and the continuation of the principal stock; the others reserved on the first mother branches give on each side the shoot which is to continue them to a first rising branch. The rest of the prunings are made on the same principles as the second, till the whole *espalier* is formed. Their object is to lengthen the main stock and the mother branches, to give space to the rising branches on each of these last, and to prune them to one or two eyes.

Pruning of the propped vines at Paris. This consists in binding to props three mother branches; they are particularly examined; the five or six largest shoots of each are taken off to three or four eyes, if they are strong; the middling shoots to two eyes, and the weak to one; the weakest shoots are cut off entirely. If they were pruned to greater length the fruit would not be so large, nor of so good quality, and the vine would not live so many years: no more fruit should be allowed to grow than the vine is able to nourish. Vines are not permitted to grow high in cold and temperate countries, such as Paris, Lorraine, Burgundy, Germany, &c.; but they are allowed to grow in warm countries, the south of France, Italy, Greece, the coasts of Barbary, &c. At *Meaux en Brie* and towards Lagny where the soil is very free, rich and stony, *(franche, substantielle et pierreuse,)* the vine is planted in trenches at six decimetres (eighteen inches) apart, and in (between) beds of one metre (three feet.) For two years they plant in the trenches, near the vines, asparagus roots; and on the ridges French beans, chervil, potatoes, parsley, &c. The vine grows in a year four or five decimetres (twelve or fifteen inches) long, it is turned in hoops, and a great quantity of bunches is produced in this way. Palladius* has described this form. The props are one metre thirty centimetres (four feet) long; they are sharpened at both ends, that if one should happen to break, the other may be used; they are forced into the ground by the arms of the laborers, and the fatigue of this work is astonishing. It is true that they are aided by a sort of harness, but this does not preserve them from attacks of spitting of blood, of hernia, consumption, &c. It appears to me that it would be better to sharpen the prop at one end only, and make use of a mallet to drive it into the ground.

Culture and pruning of the vine en espalier at Fontainebleau and at Thomery. Before entering into the details of this culture, I think it necessary to describe the position of these two places.

Fontainebleau, a town in the middle of the forest of the same name, which contains 16,436 hectares of land, is by its situation defended from winds and cold, and in the best position for the culture of the *Chasselas.*

Thomery, a village two leagues to the east of Fontainebleau, is situated on a hill to the east and north, a little sloping towards these two quarters; it is separated from the Seine by a small meadow always overflowed in winter, and surrounded on all sides by the elevated parts of the forest which shelter it from the winds and other atmospherical phenomena.

The *Chasselas* has been cultivated at Thomery only forty years; before that the village did not exist—there were only some isolated houses. The population at present is one thousand, and this small number of skilful and industrious inhabitants furnish Paris with all the *Chasselas* it consumes.

The *Chasselas* of Fontainebleau and Thomery has always a very thin skin, and a large and very sweet berry: that of Montreuil-sous-Bois, which comes nearest to it, is smaller, and the skin is less delicate; but it is also a good grape. At Thomery, the *Chasselas* produces as abundantly in sandy and flinty lands,as in free and rich *(franches et substanielles)* soils, which proves that it is the situation, and not the soil, which brings it to that state of excellence; the pruning also appears to contribute to it. It is probable that by cultivating the Chasselas in a similar situation, and pruning it in the same way, the same product would be obtained. The following is the culture and mode of pruning in these two places, according to Mr. Poiteau,* added to the notes of the most skilful vine-growers in the country. The Chasselas is cultivated on walls two metres sixty centimetres (eight feet) high, with a coping jutting out three decimetres six centimetres (eleven inches) and roughcast with white mortar. This jutting has been given to the coping only within the last five years: formerly it was not greater than two centimetres (six inches.) Even now almost all the walls have the old coping, but when the grapes are upon the point of ripening, the cultivators put slates between the tiles, and in this way make as good a substitute as they can for the new jutting, as a protection from the burning sun when the grapes are almost at maturity: but on the walls built now, the jutting to the coping is always three decimetres six centimetres (eleven inches). The planting of *Chasselas en treille* against walls is made in a southern exposure; the exposure to the east is not less good.

Ten or fifteen days before planting the vines, the ground is broken up near the wall to the depth of sixty centimetres (two feet,) and to one metre thirty centimetres, or one metre sixty centimetres (four or five feet) [from the wall,]† observing, if the land is wet, to give a slope to the working to carry off the rain water from the wall: but it is not wet at Thomery nor at Fontainebleau, and it is therefore unnecessary to give a slope in breaking up the land there. A parallel trench is afterwards

* Economie rurale, Liv. iii. chap. 11.

* Le bon jardinier.

†Something seems to have been omitted here in the original, which is supplied by conjecture.

opened two decimetres thirty centimetres (eight inches) deep, and sixty centimetres (two feet) wide: slips with old wood attached *(boutures-crossettes)* are laid crosswise in the bottom of this trench, the tops are turned toward the wall, and at the distance of four or five decimetres (twelve or fifteen inches) from each other: they are covered* with one decimetre three centimetres (three or four inches) of earth which is pressed down; the ends of the slips are set up, and afterwards the trench filled with earth, or better, with mould mixed with earth. In the following spring the slips are pruned to two eyes, and each supported by a prop; the next spring the principal branch only is preserved, the others are removed. This branch is laid down as in the first year, the others having been taken off; it is pruned also in the spring to two eyes, and in the third year it reaches the wall. By proceeding thus the vine is very well rooted. Afterwards, if the stocks perish, they are replaced by the same slips, but they are buried at only five or six decimetres that they may reach the wall in the second year.

A trellis work is fixed against the wall, and in the spring the first stock is cut off at two decimetres (six inches) from the ground above a good eye: this eye and the one below it, give, each, one branch which is trained upon the wall, under the trellis, by gently bending them, one to the left and the other to the right, in a straight line, as if they both proceeded from the same point: they are fixed and tied with withs of straw or wet rye. It is only the trunk that is not confined under the trellis. Experience has shown that the nearer the grapes are to the wall, the better they become. If bunches proceed and grow under the cross-pieces, they are raised or lowered a little to save them from pressure. When the second stock is sufficiently high, it is cut off, but at sixty centimetres (two feet) and when the two others have also reached the proper state they are cut off, the third at one metre (three feet) and the fourth at one metre thirty centimetres (four feet;) but while waiting for them to reach the desired height, these lateral shoots are pruned to one or two eyes to obtain fruit. As soon as the two arms of this second stock have been pruned, the shoots must be removed. The stocks having reached their proper height, and the two last branches being sufficiently extended, to form their arms, the pruning should be finished as described by M. Poiteau.† "These two branches are to be pruned till they are each four feet long; longer than which they are not to be allowed to grow: the pruning is to be so managed as to obtain three shoots placed at the distance of from four to six inches from each other; two of these shoots will be converted into *runners* [*coursons*] at the succeeding pruning, and the third, which is farthest off, destined to lengthen the arm. Care should be taken during the summer, to attach vertically on the trellis, the shoots intended to make *runners*, and to extend horizontally that which is intended to continue the lateral branch [*cordon.*] At the second pruning the two runners will be pruned to two eyes and the terminal branches will be again pruned so as to leave proceeding from it three shoots at from four to six inches apart; two of these shoots will be trained vertically, and the third extended horizontally, as in the preceding year, and so in succession until each arm is four feet long, when the terminal branch also is to be pruned as a *runner*. Each arm should have eight *runners*, all placed as much as possible on the same side. When the last stock has acquired its two arms, all of four feet each, there will be on a surface of eight feet square eighty *runners*, which, pruned to two eyes, will each produce two branches, yielding each at least two bunches of grapes."

Thus experience has shown, at Thomery, that to obtain more fruit it is necessary to allow no more than one hundred and twenty centimetres (four feet) on each side, otherwise the bunches would grow only towards the extremities and not towards the body of the vine: but it is to be observed, that all the walls situated to the south and the east are taken up with arbors of *Chasselas* alone. Fruit-trees are never seen on such walls; they are planted to the north, where may be found in abundance the English pear, which succeeds astonishingly, the peach of Malta, the *crassane*, (a pear,) the winter *bon-chretien*, *&c.* It is only within the last six years that advantageous use has been made of walls in this situation.

Culture of the vine on trees, [*en hautains.*] For many ages the vine has been cultivated on trees in Italy, on the coasts of Africa, in Asia Minor, Greece, the Islands of the Archipelago, &c. To marry the vine to trees imports that they serve it as a support. The trees most employed in this culture are a species of the elm [*orme champêtre,*] of the poplar [*peuplier noir,*] of the maple [*érable à feuilles de frêne,*] of the mulberry [*mûrier blanc,*] and of the almond [*amandier à coques tendres;*] the evergreens and walnut trees are excluded. As in France, the vine grows in all lands if they are not watery.

The land is ploughed, and planted with young trees in parallel lines fifteen metres (forty-five feet) apart; these trees are to have no branches till two decimetres six centimetres (eight feet) above the ground.

When these trees have taken and are well rooted, a trench is to be dug at the foot of each, and in this are to be planted two slips *en crossettes* with roots, and having only two branches on them, at sixty centimetres or one metre (two or three feet) from the tree, but not far from each other; they are to be laid down in the little trench quite to the foot of the trees, and to be set up against them so as to be supported by them. Mago* and Virgil† direct that the trenches should not be entirely filled up the first year; they were right, since the same practice is continued to this day. The *crossettes* should be two or three years old. The space between the trees is necessary, because if they were nearer they would be crowded in their growth. If the browsing of cattle is apprehended, the vines must be enclosed. Cabbage, turnips, lucerne, corn, &c., are planted in the intervals. Palladius‡ recommends to cut off the ends of the roots of the *crossettes* before planting; but it is better not to do so, as this would deprive them of the means of drawing much nourishment from the earth.

*The original has *change* which I suppose a misprint for *charge*.

†Le bon jardinier.

*Chap. 6, Liv. 5. †Geor. Liv. 2.

‡Liv. 3, Chap. 10.

The vine is pruned, the first year, to three eyes, and cut in the middle of the space between the joints: the following year it is pruned again to three eyes in the growth of the year; and in the same way successively till it has reached the first branches of the trees. Then two of the vine branches are directed into the top of the tree, and the two others are extended, the one to the right, the other to the left, under branches of the tree, to form garlands, which are to unite with garlands on the neighboring trees. The vine is fastened to the trees with some soft ligament that it may not be wounded. By this way of pruning much wine is made, but it is not of the first quality. If it is desired to have the wine as good as possible, but in less quantity,* fewer branches are left upon the vine, and they are pruned shorter; the vine is also directed more towards the top of the tree than under and among the boughs.

The vine having acquired the proper height and the required directions, the pruning consists only in taking out the old branches which have borne, and leaving the new ones; these are pruned to two eyes. The small branches and sprouts which straggle from the garlands are cut off. Every year the vine is united and tied again with rushes.

Every two or three years the trees which support the vines are trimmed; the branches which grow at a distance from the garlands are cut off; the dead wood also, and the small interior boughs are taken out.

M. Loiseluer-Deslongchamps recommends the cultivation of the vine on trees in the centre of France, where it has never yet been so cultivated; a weak wine only, it is true, is obtained, but yet much superior to all the drinks of which wine does not make a part, and a precious resource for persons of small means.

Manures. Vineyards should be manured every two or three years; and only well-rotted compost, or mould which has been used for gardeners' beds should be employed; manure from unrotted dung-hills would communicate a portion of its odor to the grapes. The rotted manures are advantageously mixed with earth obtained from cleaning out fish-ponds, ditches and rivers, with turf, soil of heaths, marl, broken shells, the *marc* of grapes, &c. These manures, very finely divided, are spread in autumn over the whole surface of the vineyard, and they quicken the vegetation. The vineyards are improved also by removing a part of the soil, and replacing it with better.

Tillage. All the lands of vines planted in fields, are worked at Paris in November and December, after having taken up the props and laid them in piles. The *binette* is used which goes one decimetre (three inches) deep into the earth, and the roots of the vine are a little uncovered. The earth is collected in little heaps in the intervals between the vines. The pruning being given in February or March, the land is worked again, but deeply, and the little heaps of earth are made to disappear. If the land is sloping, it is worked diagonally, and the earth is always thrown up rather than down, that the upper part of the vine may always keep the same quantity of earth.

The vineyard is worked three times more with the *binette;* the first time before blossoming, a second time when the berries are formed, and the third when the bunches begin to ripen: the object of these workings is to extirpate the weeds, that the rain, the gases and light may penetrate the earth and pulverize it. The moss and detached bark are scraped off, particularly in warm countries.

Propping. In the north and centre of France the vines cultivated in fields, and those not cultivated on arbors in gardens, are propped. This operation is performed after the spring working: the props are driven vertically into the ground with a mallet, at the foot of the vine-stock at one decimetre six centimetres, (three or four inches) to bring the branches together, and to prevent them from being thrown down by the wind; in driving them down, care must be taken to spare the roots and not break off the buds as Columella* directed.

Blossoming. No work should be done in the vineyard while it is in bloom, that the progress of *fecundation* may not be interrupted; if the vineyard were worked or watered during this time, a part or the whole of the pollen might be carried off, which would occasion the fruit to fall; this frequently happens, on that account, after rains or high winds. *M. Oscar Leclerc* † advises to make an incision in June, to prevent the fall of the flowers by leading off the sap.

Stripping the leaves. When the grapes have nearly attained their full size, the leaves are stripped off, as it is desired to color the fruit and to develope the formation of the sugary mucus. On vines raised on trellises, all the leaves are taken off which touch the bunches, when there are others a little farther forward sufficient to break off the rays of the sun, without hindering them from entering and giving color to the fruit. The air also then circulates freely; the leaves which masked and touched the bunches wounded them, and served as abodes for the insects which feed upon the grapes, and the light did not penetrate to the bunches. The foot stalks of the leaves are left; the vine-dressers of Thomery and Fontainebleau strip the vines with great dexterity, and fill their hands with leaves in a moment without touching the bunches.

In general, it is necessary to strip off the leaves a little more from vines growing against walls or on hill-sides, than from those which are in the shade or on moist lands, because in such situations, says Bosc,‡ the leaves protect the bunches from cold winds, and preserve the caloric which, passing to the fruit, hastens its maturity. Columella§ thought it not advisable to strip off the leaves in Italy in warm districts, and even recommended to shade, with straw, the vines loaded with bunches when ripe, that the heat might not dry them; while he advised to strip off the leaves in colder places that the grapes might ripen and not rot.

Enemies. Many insects destroy the vines and eat the grapes.

The *pirale de la vigne.*‖ The larva lives upon

* *Qualité* in the original, evidently for *quantité*.
† Annales de la Société d'Agriculture.

*Economie rurale, Liv. ii. chap. 2.
†Annales de la Société d'Agriculture.
‡Cours complet d'Agriculture.
§Economie rurale, Liv. ii. chap. 2.
‖As the insects are described, it is thought best not to attempt to give them English names, and the translator's ignorance of entomology might occasion mistakes, if it were attempted.

the vine, it rolls and eats the leaves, the stems of the leaves, and of the grapes. This caterpillar, says *Bosc*, is green, with a yellow spot on each side of the first ring, and a black head; it causes much damage in the environs of Paris and elsewhere. Robergeot directs for its destruction, in the butterfly state, to make fires as the night comes on; the butterfly is attracted to them immediately and burned. The fires are repeated frequently, and destroy at the same time the *bombyces*, the *noctuelles*, the *phalenæ*, and other insects which fly in great numbers into the flames.

The *erineum de la vigne*. Every body knows this (parasitic) plant, which appears on the inferior surface of the leaves in the form of spots, at first white and afterwards red and irregular; it destroys the leaves; the remedy is to pull off those that are attacked and burn them.

The *teigne de la vigne*. The larva, called vine-worm, lives in the berry, and proceeds, says Bosc, from one to the other by spinning itself a gallery of silk. The damaged berries and galleries must be taken off and the whole burned.

The *eumolpe de la vigne*, *gribouri*, or *coupe-bourgeon*. This eats the shoots, rolls the leaves, and deposites its eggs which are hatched into worms. The parts attacked must be taken off and burned.

The *Sphnix de la vigne*. The larva eats the leaves; but it is rare. The remedy is to remove the leaves and burn them.

The *attelabes vert et cramoisi*. These two insects in the state of larvæ eat the leaves, the leaf stalks, and the stems of the fruit. The injured parts must be gathered and burned. These insects are called also *urbère*, *diableau*, *bêche*, *lisette*, *velours vert*, and *destraux*.

The *hanneton*. The larva, under the name of white worm, gnaws the roots of the vine and kills it. The earth should be dug to find the worm. It is said that if lettuce is sowed near, the worm will quit the vine to seek the lettuce.

The *wasps* and *drones* are also very troublesome; they should be killed by smoking them with a bundle of straw. Bottles of water sweetened with honey are also hung up in which they drown themselves.

Snails and *slugs* eat the leaves; they should be collected in the morning and after rains, and removed from the vineyard.

Many birds feed on grapes, the thrush, the starling, the loriot, the linnet, &c.; these must be frightened by scare-crows or killed.

Forward grapes, (primeurs.) To obtain these at Paris, from the grapes on trellises, fifteen days before the period of ripening, an annular wound is made on the vine when it is on the point of maturing its bunches.

Grapes are also obtained twenty days earlier than those on trellises, by placing the vine in a green-house, or other place where it never freezes: the vine stock is brought out through the wall. When the vine is in bloom, the young bunches are inserted into transparent glass bottles; the grapes, heated by the sun, ripen early, and when they are ripe the bottles are broken. But the most expeditious method is to place a portable green-house before the trellis, that the sun may shine upon the glasses and warm the vine; a fire also is kindled.

The vintage. The grapes are known to be ripe when the stem has become brown, and the berries fall at the least touch; the juice is then sweet, sticky, and sugary: the fruit is gathered in fine sunshiny weather, and the bad berries should be taken away.

About twelve days before they are ripe, a greater or less number of bunches are enclosed in bags of hair-cloth; in this way they are kept till hard frosts, and are protected from the birds.

Preservation. Grapes gathered a little while before they are ripe, are kept in square oaken chests lined with lead, and of any required size; they are lifted by iron rings. In the bottom of these is first placed a layer of moss, and afterwards a layer of grapes, without wiping them, at four millimetres (two lines) apart; this is continued till the chest is full. The chests are closed hermetically, to prevent the air and light from penetrating: when this is finished they are let down into a well, each attached to a chain, and they are suspended near the water. When grapes are wanted, the chain is drawn up, they are taken out, the chest closed again, and again let down near the water. These grapes keep till February if no water enters the chest.

Grapes are kept also by putting the bunches on hurdles spread with wheat straw: they are laid side by side without touching or having been wiped. The hurdles are afterwards set in the sun, if it shines; the bunches are turned, and when the moisture has evaporated, the hurdles are placed in the fruit loft.

H. TOLLARD.

[Since receiving the foregoing translation, we have noticed the following passage in the Horticultural Register of Boston, which refers to some of the practices described at large in this article.]

"The mode of training the vine at Thomery, appears to have originated from the well-known and singular fact, that an extended vine produces not fruit except at its *extremities*. That a vine carried beyond the bounds of a limited extent, ever becomes barren at its base. The system of training and pruning, which is there practised, and with such signal success, may therefore be considered as the perfection of every mode which has ever been devised.

Thomery is a village near Fontainebleau, and but a few leagues from Paris. Its grapes, with which the markets of the capital are supplied, are proverbial for their superior excellence. It will appear evident, that this justly merited celebrity, is not due either to the superior quality of the soil, or to its favorable exposure; but the *management* of their grapes *alone*. For Thomery has not a happy exposition; the quality of the soil is inferior, in many parts steril. It is on the side of a hill, facing north and east, and sloping to the river Seine, which washes its base; the soil is clayey, cold, and almost incredibly hard to cultivate."

From the Genesee Farmer.

CURING CORN FODDER.

It has been a generally received opinion among farmers that corn fodder should be perfectly cured before it is placed in the stack, or mow, to prevent the accumulation of mould on the stalks. In this, I had always acquiesced, but an experiment invol-

untarily made, has gone far to convince me that my former views were erroneous. Being compelled to put up my corn fodder in a damp state, I had but small hope of its proving of any utility in wintering my stock, but was happily disappointed by the trial.

When I commenced feeding it out, much of it was entirely covered with white mould, and some quite rotten, yet to my surprise it seemed to have acquired additional attractions thereby, as my cattle devoured it with greater avidity than they did that which acquired no mould. I have often remarked, that cattle would show a marked preference for hay near the bottom of a mow, which had undergone a greater degree of fermentation than that nearer the top, and generally denominated "*mow burnt.*" Without philosophyzing on this point, I would barely suggest the inquiry, whether by thus carrying on the fermentation of food *previous* to its being fed to cattle, an advantage is not gained in the increased facility it imparts to the process of digestion?

I. D.

ASHES AND GYPSUM AS MANURE FOR CORN.

To the Editor of the Farmers' Register.

Amelia, February 27, 1835.

A gentleman living in Maryland, on the Patuxent River, made last year twenty-five barrels and some pecks of Indian corn to the acre, on many acres. This remarkable crop seems almost wholly attributable to his manner of manuring, as his planting, culture, &c., do not seem to be different from many others. He prepared his land well; (it was a clover lay,) laid it off both ways, five feet by two and a half; dropped three grains of corn in each check, and with the corn, put a handful of leeched ashes mixed with plaster of Paris, (in the proportion of one of plaster to two of ashes) in each hill or check; cultivated it both ways well with the plough, and hoed well. The amazing product seems to me to be principally attributable to his peculiar application of manure, and why cannot we farmers of Virginia pursue the same plan? No plantation on which ten regular fires are kept, could fail (with care) to produce 300 bushels of ashes after the lie is taken from it: this, with 90 bushels of plaster added to it, would manure after the above manner, at least 30 acres. Suppose these 30 acres should produce ten barrels to the acre, (of which I see no reasonable doubt,) can we desire a better application of labor and money? But if 25 barrels be made in Maryland, why not in Virginia? I feel entirely convinced, *that no effectual scheme of general improvement can be suggested, which does not contain some feasible plan for lessening the culture of Indian corn* —I do not mean to lessen its consumption, but to reduce the surface necessary to produce the quantity required for consumption. He who owns a farm of 300 arable acres, and ten effective hands, with six work horses, will find 300 barrels of corn necessary for his annual consumption. To make this quantity he will, on the average of farms, (between tide-water and the mountains,) put in corn, from 100 to 130 acres of land—and with this large field, would as often fail to make the requisite quantity, as succeed. Suppose, by any plan, 30 acres would produce as much as the 130, the benefits need not be pointed out. I am not supposing the plan above named, is itself to make the land rich. But what farmer does not see at once, what a vast deal of labor he would thereby be enabled to direct to other purposes than making corn. Every observing man knows that from the first of May to the fifteenth of July, the farmer is perpetually on the *stretch* to keep in good order his field of corn. He has no time to save hay—is hurried in his harvest—collects no materials for manures—and indeed neither does, nor can do any thing but work his corn.

There can be no reasonable doubt, if we are to believe the experience of others elsewhere, that any farmer now making 300 barrels of corn on 100 or 130 acres, has the means of making the like quantity on 30 acres. Nay more, every observant man knows, that he has acres every year (not many to be sure) that actually do produce at that rate, or nearly at that rate—and yet so universally are old habits, that we find it impossible to resist the absurd one of planting our usual crop, although we know that one-third, if not one-half of the field, will not repay the expense of our ploughing.

I would now suggest, through your Register, to my brother farmers in middle Virginia, (especially) to make this year a small experiment—to take one-tenth of their usual field, and manure and cultivate it after the manner so successfully pursued in Maryland, and observe the result. If land which usually produces three barrels of corn, shall by this method be made to produce ten, (of which I have no doubt) I am sure a new impetus, under favorable auspices, will be given to our agricultural improvement. Even if so favorable a result should not follow, the labor will not be lost. I am now collecting ashes, for at least 30 acres—if we should live until the autumn, I will give you the results.

H. M.

From the Louisiana Journal.

DIFFERENCE OF PRODUCTIONS ON THE HIGH AND ALLUVIAL LANDS OF LOUISIANA.

It must be apparent to every reflecting mind, who is acquainted with the localities of the state, and is the least conversant with agriculture, that the culture which will suit the alluvial parishes, will not answer in the eighth judicial district. We speak on this subject knowingly, for we have observed the staples grown in the alluvial parishes, and in the highlands. It is even now questionable whether cotton can be grown on the Mississippi lower than the parish of St. James. In that parish we have seen cotton growing that looked well. In Washington, St. Tammany and St. Helena, the rye is raised to an advantage; yet in West Feliciana and East Baton Rouge, we apprehend it would make but a sorry crop, while in the alluvial parishes it would be utterly profitless.

If we are correctly informed, many efforts have been made to introduce the improved breed of cattle on the coast, below Baton Rouge, all of which have proved abortive, because the stock imported had died the first summer after their introduction. Yet we are warranted in saying that the same breed of cattle have lived and prospered on the highlands, not exceeding twelve miles from the Mississippi. Swine, it is well known, will answer no valuable purpose on the alluvial lands of the

Mississippi, below the Manchac. An effort is now making to introduce the *thin rind* hog into the parish of St. Helena, and we do not entertain a doubt of its entire success. Many are the abortive attempts made in the culture of the grape, on the banks of the Mississippi. Yet a grape, delicious to the palate, and capable of producing excellent wine, is indigenous to the parishes of Natchitoches, Claiborne and Ouachitta. So it is found that the rich lands around New Orleans is not favorable to the culture of the sweet potato—whereas the pine woods is the soil in which that vegetable most delights.

As with the vegetable, so with the animal kingdom. No domestic animal, calculated for service, or the table, is reared with the same facility on the low, as on the highlands. The feathered tribe we believe is an exception to the rule.

HINTS ON SHEEP HUSBANDRY.

Selected and collated for the Cultivator.

In an agricultural view, simply, the importance of sheep is extreme; since, by their assistance alone, thin, barren, upland soil, so often the far greater part of a country, can be cultivated to advantage, which otherwise could not generally be cultivated at all. The sheep will subsist and multiply on those barren soils, where no other animal would be maintained with equal profit: he is equally calculated for the most deep and fertile, challenging competition, and dividing the palm of profit with an ox, and is excluded from such only as abound in stagnant water, the moist exhalations of which are naturally destructive to his constitution.—*Lawrence on cattle.*

The *bodily constitution* of the sheep, as of the goat, the deer, the camel, the hare and the rabbit, is usually called hot and dry; we however know, from unquestionable experience, that dry soils, a dry air, dry provender, and green food, which does not abound in cold and watery juices, are most appropriate and salutary to them. Indeed the contraries are replete with danger to the sheep, most particularly, which is naturally and constitutionally subject to serious effusion, producing a dropsy of peculiar kind, either universal or circumscribed, but more usually the latter, extending indifferently to all parts of the body.

This efflux of water, or rather watery tendency, in all the fluids of the body, gradually produces in the solids disorganization, mortification or rot. Catarrhal affections are the most usual primary causes of rot. These ideas very plainly indicate the proper situations, food and treatment of sheep.

Sheep have often been described as, of "a weakly constitution, liable to be exhausted by fatigue, and ill able to bear the extremes of heat and cold, subject to many diseases, most of which are contagious." Such notions are to be received with much allowance, for in truth, this useful race seems ennobled by nature to accommodate itself to all the vicissitudes of climate, and to nearly the extremes of heat and cold, of which the husbandry, ancient and modern, of both northern and southern countries, forms the best proof. We see them accustomed to brave the most rigorous of these extremes unhurt, liable, as might be expected from the nature of the case, to casualty and loss, which timely shelter might prevent. The sheep well fed, from its fleecy covering and gregarious habits, whence results an atmosphere of considerable warmth, remains very little affected by intense cold, if unaccompanied by moisture; he is perhaps more unfavorably affected by great heat, but continues safe under either extreme, with the advantage of sufficient shelter, obviously one of the most important points in sheep husbandry. The various diseases incident to sheep have their origin almost exclusively in neglect, improper situations and treatments, or errors in feeding. Reverse these, and diseases among sheep would be as few and rare, as they are now numerous and rife throughout our sheep districts; another grand point in their husbandry.—*Ib.*

From the Cultivator.

INDIAN CORN.

There is no crop which habit has rendered more indispensable to the wants of our families and our farms than this. The late John Taylor, of Virginia, termed it our "meat, meal and manure." Holding this high rank in our farm economy, it is a subject of moment to adopt the best mode of culture. As many districts are shy in producing wheat, and as this crop is seriously threatened by the new (to us) wheat insect, it becomes more a matter of solicitude to render our corn crops productive. But as this grain demands more labor in its culture than other grain crops, so it is more important, on the score of profit, that it should be well managed: for if thirty bushels an acre, be considered only a remuneration for the labor bestowed on the crop—all that the product falls short of this must be a loss—and all that it exceeds, a net gain to the cultivator. The first consideration in regard to the corn crop, is to give it a dry mellow soil; the second, that this soil be rich, fat or fertile; and the third, that the seed be timely put in and the crop well taken care of. Neither wet grounds, nor stiff clays, nor poor grounds, will repay, by their product, the labor required on a crop of corn. He who has no other lands but these, should not attempt to raise it as a field crop. He had better bestow his labor upon other objects, and buy his corn. We think the best preparation for corn is a clover lay, well covered with long manure from the barn-yard, well ploughed—and well harrowed. It is better to give sixty loads of dung to three acres than to ten, upon the ordinary lands of our neighborhood. The difference in product will not make up for the difference in labor. Corn can hardly be dunged too high. What we have to recommend, that is not common in the culture of this crop, is—that double the usual quantity of seed be applied—the number of plants to be reduced at the weeding—in order to ensure three or four stalks in each hill; that the roots be not broken, nor the manure thrown to the surface, by the plough, but that the harrow and cultivator be substituted for it, which will sufficiently mellow the surface and destroy weeds; and that the hills be but slightly earthed. By ploughing and hilling we conceive the manure is wasted, the roots broken and bruised, and limited in their range for food, the crop more exposed to injury from drought, and the labor increased.

If the fodder which the stalks and shucks afford is an object to the farmer, as they certainly will be when their advantages are appreciated, the securing these in good condition is a matter of importance. To effect this, as well as to secure the crop from the effects of early autumnal frosts, we recommend the practice we have long and satisfactorily followed, of cutting the crop at the ground as soon as the corn is glazed, or the surface of the kernels has become hard, and of immediately setting it up in shocks to ripen and cure. This we have always been enabled to do early in September, and once in the last week in August. The quality of the grain is not impaired, nor the quantity, in our opinion, diminished, by this mode of management, while the fodder is greatly increased, and its quality much improved.

NEW MOVING POWER.

At a meeting of the French Academy of Sciences, on the 16th of June, a very interesting communication was read from M. Thilorier, a skilful chemist, who exhibited to the Academy the apparatus by which he procured a litre (a quart) of liquid carbonic acid in a few seconds. The properties of this substance, he observed, have been but little examined, chiefly because it requires to be confined in close vessels, hermetically sealed, and capable of resisting a great pressure. It surpasses all known bodies in the expansion and contraction which it undergoes from given variations of temperature; from 32 to 86° Fahrenheit, a column of the liquified gas is elongated one-half. With the same change of temperature, a similar column of air is only elongated one-eighth. This enormous dilation, M. Thilorier thinks, will, in future, afford the elements of a moving power infinitely more effective, as well as economical, than that which is derived from the expansion of vapor.

From the Cultivator.

ROOT CULTURE,

Presents many advantages to the stock farmer. Roots are less exhausting to the soil than grain; they are admirably fitted to form a part of a course of crops; are very beneficial in pulverizing the soil; afford abundance of food for farm stock; may be substituted for grain; and serve to augment and improve the valuable product of the cattle yard. An acre of ground, under good culture, will produce, on a fair average, twenty tons of Swedish turnips, mangel wurtzel, carrots, parsnips or potatoes. Supposing a lean animal to consume one bushel a day, and a fattening animal two bushels, the produce of an acre will then subsist three lean bullocks 110 days, nearly the period of our winter, and three fattening ones 55 days.—We merely assume these as reasonable data, and ask, if the result does not prove the profitableness of their culture. But we are not permitted to doubt upon this subject, if we credit the testimony of those who have tried them, and whose continuance in the culture is the best proof of their value. Roots enter largely into the system of Flemish husbandry, which has been extolled as inferior to none other, and in many parts of Great Britain, turnips are considered the basis of profitable farming. In our country, root culture is winning its way to notice and to favor. Few who have managed it judiciously have been willing to relinquish it; while others are annually commencing it. The great obstacles to the more rapid extension of the culture among us, is the want of experience, the want of proper implements, as drill barrows, cultivators, &c., and the labor of securing the crop in winter. The apparent magnitude of these obstacles is daily diminishing, and we shall ere long discover, that the root crop may be cultivated, and secured for winter use, as easily as other farm crops. We have had very little experience in cultivating carrots, parsnips or mangel wurtzel as field crops; but the Swedish turnip has been a favorite crop for some years; and we can truly say, it has been one of the most sure and profitable that we have taken from our grounds.

From the Cultivator.

PRUNING FRUIT TREES.

We deprecate the old practice of trimming fruit trees in autumn, winter or spring. Vegetation being dormant, the tree can make no speedy effort to cover the wounds inflicted by the knife and saw. These wounds, exposed to searching winds, and a scorching sun, become diseases, and often bring on premature decay. Besides, an attentive observer must have noticed, that whenever pruning is performed in the spring, three shoots are often thrown out where one has been cut away, so that the very evil which it is intended to remedy, a redundancy of useless spray, is increased rather than diminished. If pruning is performed in summer, after the first growth, say in the first fifteen days in July, or the last seven in June, the tree then abounds in elaborated sap, the wounds are speedily healed, and amply protected, by the foliage, from the malign influence of the sun and winds. We have remarked in successive years, and the fact is noticed by others, that when a tree is pruned in summer, there are very seldom any sprouts seen to shoot from the parts where the knife and saw have been employed. If the reader will try the experiment of summer pruning upon a few trees, we have little doubt he will agree with us, that it has a decided preference over that performed in any other season. The grand error of our farmers consists in not pruning at all, or only at long intervals, when it becomes necessary to take out large limbs, and in doing this, the axe is too often employed, which mangles the trees so badly that they seldom fully recover from it. Pruning should be performed annually, while the limbs to be taken off, and the spray, are small. The operation is then trifling and safe, and the wounds speedily heal. We want no better evidence of a slovenly farmer, than to see his fruit trees so enveloped with suckers as to render it doubtful which is the parent—a case which, bating a little fiction, is often witnessed by the traveller.

From the New York Star.

A NEWLY DISCOVERED CEMENT.

Mr. Obadiah Parker, a native of New Hampshire, and for many years past a respectable resident in Onondaga county, in our state, and now in this city, has, after numerous experiments, discovered a composition stucco or cement—which, from a state of liquid mortar, hardens in a few

days—say eight or ten—into a solid substance or stone, as impenetrable almost as granite, and susceptible of a beautiful polish. It is, apparently, chiefly of a calcareous nature, or like the hardest kind of marble. Any color may be given to it; and it not only defies, but actually acquires greater density and solidity, and less brittleness, under the changes of the atmosphere. He has obtained a series of patents—and at Catskill, recently was built, as a specimen, the wall of a small edifice eight feet high, which in eight days—recalling to mind the fable of Medusa—was perfectly *petrified* with its door, windows, &c., all of which is testified to by the owner to us personally, and by the certificate of the judges of the county and the principal citizens of the place. It is impossible to foresee the consequences of such a discovery. It surpasses, without doubt, all other cements; and the material is so cheap, that entire houses, of any shape or dimensions, fortifications, canals, aqueducts, &c. may be thus built up in a few days, which would utterly supersede brick and stone, and effect a complete revolution in architecture. What will not art yet imitate and accomplish?

For the Farmers' Register.

HINTS IN RELATION TO THE DWELLINGS AND CLOTHING OF SLAVES.

In the construction of negro houses it is desirable to combine thorough ventilation with the requisite warmth. The following suggestion may contribute somewhat to that object. Let the under plank of the boxing at the ends of the joists be furnished with hinges, so as to hang loosely off from the house in summer, and occasionally, in mild weather in winter; and at other times to be hoisted and fastened by bolts placed at suitable distances along the inner edge. This pendent lid will not admit rain, and yet afford a circulation of air between the joists, the spaces between which should be left open—thus relieving the room from foul air, which being specifically lighter than that of the atmosphere, ascends. Candor, however, requires it to be stated that in too many of our negro-quarters it is wholly unnecessary to resort to this extraordinary method of admitting fresh air.

On southern estates of much magnitude it is impossible to employ, advantageously, all the females within doors; and besides, with care, women are well adapted to much of the labor of the farm. It behooves us, however, to make them as comfortable as possible; and a large cape of knapped cotton, or some stouter material, descending half way between the elbow and the wrist, will be found extremely conducive to that end. It should be buttoned closely under the chin, but be loose in front. It protects the neck and shoulders, otherwise exposed; is easily put on and off, and but little encumbers the arms when at work.

A SOUTHRON.

WASTE LANDS.

It seems there are upwards of eight millions of acres of waste lands in the Scotch and English counties; or more probably, according to the writer, ten millions of acres, and four millions in Ireland.

ON THE IMPROVEMENT OF AGRICULTURE, AND THE IMPORTANCE OF LEGISLATIVE AID TO THAT OBJECT. DESCRIPTION OF THE SOUTH WEST MOUNTAIN LANDS.

To the Editor of the Farmers' Register.

Charlottesville, March 7, 1835.

Sir—The Agricultural Society of Albemarle, has adopted a resolution requiring one or more of its members, at each annual fair, to present an essay on some agricultural subject. I now send you a copy of the first essay, in pursuance thereof, read to the society on the 31st October last; together with Gov. Barbour's introductory remarks. I am directed by the society, to request their publication in the Farmers' Register.

I am, with great respect,

A. BROADHEAD,
Secretary A. S. A.

Gentlemen.—I avail myself of the occasion, to offer you my very sincere congratulation on the past usefulness, and the present prosperity of our society. While we have to regret the failure in Virginia, of so many attempts kindred to our own, it is a subject of just pride to us, and particularly to those who have persevered from the beginning of our institution, that ours has lived so long; and instead of declining, furnishes at this time, in its increase, a sure guarantee of its successful duration.

Of its past nsefulness, we of the society (whose misfortune it is to be advanced in years) are swift witnesses. Such of us can well remember the barbarous system of cultivation that prevailed in our youth, and the consequent desolation of our lands which met us wherever we turned our eyes. Behold now the vivid contrast—striking as between the living and the dead. When I say this, it is not idle vaunting, but founded in sober truth. I am quite sure you will all respond to it affirmatively. The proof of its justness is furnished, not only in the increase of our products, the gratifying spectacle of verdant fields in lieu of frightful wastes, but in the testimony of our brother farmers, who come from afar to profit of your agricultural knowledge, whose boundaries you have so much enlarged. And although I am aware that other causes may have contributed their influence in producing the improvement which has ensued in the country round about, and therefore it is impossible to assign with precision the exact quantum to this society, yet none will hesitate to yield it a large share. In exploring the causes whose result has been so propitious, we are forcibly struck with a fact worthy of particular consideration—and that is, the elevation of our calling in public opinion, and the consequent influence upon the direction of the intelligence of our people. Heretofore, the learned professions, as they have been by courtesy termed, absorbed almost the whole of that intelligence; drawing after them the flower of the land, as being the only road to distinction, and the least laborious method of acquiring wealth. The effect was to crowd to overflowing these vocations. Hundreds, in consequence, who might, by a proper direction of their time and talents, have contributed to the advancement of their country, became a useless incumbrance. This evil begins to diminish, and in a good degree, from the elevation

which has been given to the pursuits of agriculture. We have succeeded in attracting to our standard, a portion of that mind heretofore so unprofitably employed. This will add much to our *materiel* for improvement. For after all, there is nothing, no matter what may be the pursuit in which man is engaged worthy of himself, so favorable to success as intelligence.

While, however, much has been done by this society, and others distributed through different parts of the state, I continue of the opinion, that it is indispensable to that entire success, so essential to the best interests of agriculture, that a professorship of that science should be added to the University, with which should be connected a pattern farm, and a press dedicated exclusively to this noble science and its handmaids. You are aware, that these have long been favorite objects with me, and that I have frequently inculcated the necessity of a united effort amongst our brethren, to effect their establishment by legislative aid. Some few years past, I availed myself of a transient opportunity to invoke, in person, the legislature in their behalf. It was in vain I urged that in a society boasting of its exclusive agricultural character, the legislature had never dispensed the slightest aid to its encouragement; that while the tillers of the earth had paid ninety-nine-hundredths of the cost of the University, their particular interests had been entirely overlooked. That nothing could produce a more beneficial influence, than by placing agriculture among the learned professions. That such an institution would furnish a focus, to which communications would be made; and after passing the ordeal of experiment and intelligence, might be re-communicated to society with the approbation or disapprobation of such unquestionable authority. That there too, every new discovery and invention might be tested, so as to save us from useless expenditures, by avoiding pretended improvements, or at once profiting by such as were really beneficial—that here seeds and plants from every clime might be cultivated, which our patriotic countrymen of the navy are continually bringing amongst us—that here might be solved the interesting problem, whether the grape could be successfully cultivated in our climate, and if favorably, that millions might be saved annually in the article of wine. That the state of society made it fit that these improvements should be made at the cost of the state, as it was obvious from our coparcenary principle of distributing property, and the consequent diminution of the estates of individuals, there would be but few or none able to encounter the risks, and not unfrequently losses, attending all new experiments. That by such an establishment a fine opportunity would be offered for redeeming the pledge suggested at the establishment of the Literary Fund, that a youth from each senatorial district, of promise, and without the means of education, should be adopted by the commonwealth, and educated at her cost. These youths dividing their time between study and labor on the farm, and eventually sent out as shining lights, would impart their knowledge throughout the entire state. In addition, that the rising youth, the future men of Virginia, attending the University might profit alike of the results of study and experiment, and be able at once to direct judiciously, their farming operations, when taking possession of their estates; and by which they might avoid those vexations and losses to which our inexperienced young farmers are so frequently exposed, eventuating not unfrequently in their ruin, and entire disgust of the pursuit itself. That such an establishment under a proper head, would, were the question to be tried exclusively by dollars and cents, be still entitled to favor, as by proper regulations it might in time, by its own resources, meet every expense. And finally, that if patriotism were worth cherishing, there was nothing more favorable to its growth than to make our country worthy of the affections of its citizens—and that beneficent institutions imparting great good to all conditions, presented an object that could not fail to excite the regards of all. To my mortification, these suggestions fell still-born. They appeared as scandal to the Jews, and folly to the Greeks. There was a headlong member condescended to notice merely to denounce them, as smelling strongly of the tariff. In a few days after, an election of a door keeper came on, and I found ten times as much interest as to the result, as had been exhibited touching my proposition, which I thought, and still think, was one of national importance. Indeed, I may here remark, that I have been brought (after long observation, with some opportunity of making just ones,) to the conclusion that our free institutions have been grossly perverted from their original purpose. They were intended as means to promote the happiness of society. It is now no longer the first question, what shall be done—but the one of all prevailing interest is, who is to do it—who shall be our servants, or rather who shall be our masters—to whom are the spoils of victory to be given? The welfare of society, in the violence of the contest, is made quite a secondary question. Hence nearly all are politicians, and I fear a frightful proportion candidates for office. The interests of agriculture, so far as the government is concerned, have been too insignificant in the general strife to receive the slightest consideration. It is therefore with unfeigned pleasure I see in this society, some few at least who have escaped the general contagion, and who devote their time and talents to agriculture. To these I offer the expression of my profoundest gratitude. Ten righteous men would have saved Sodom and Gomorrah. I am quite sure that numbers may be found in this society to whom all that concerns agriculture, may be most safely confided within our contracted sphere. But, if ever the time should come when the stormy elements of party and political strife shall be composed to rest, and our legislators shall direct their attention to the just objects of our political institutions, it may then be worth while for the tillers of the earth by a united movement, to endeavor to make themselves heard in the legislative hall, so as to obtain a portion of that justice of which, as a class, they have been so long deprived. To the end that concert may be obtained, it is devoutly to be wished that agricultural societies may be every where established, embodying all the zeal and intelligence among us, which speaking the same sentiments, and expressing the same wishes, could not fail to succeed in achieving any reasonable project favorable to their interests. Beyond that the tillers of the earth do not wish to pass.

I proceed now to discharge the particular duty assigned me at this session.

I yielded cheerful obedience to the order of the society, which enjoined on me the duty of presenting at this time, an essay on some subject connected with the purpose of our institution. My only regret was that the task had not been assigned to abler hands.

In looking about for a subject, a dissertation on which might not be unacceptable, I have selected the South West Mountains; the rather as they are the abodes of many of us, and to such portion of the society, therefore, they are full of interest. This unique region stretches from the Rappahannock to James River. I have heard indeed of claims to a continuance of this peculiar soil, as reaching further both to the north and south. I can only say, as far as my observation has extended, these claims are not sustained. Its length may therefore be given at 110 miles; its average breadth at 5, and containing 320,000 acres—its latitude in 37° and 38°. Of this tract of land one-half at least, in its virgin state, was very fertile—a fourth sufficiently so as to yield a fair return to labor. The other fourth steril and rocky, but covered with fine timber—particularly the chestnut, whose duration in rails may be fixed at 60 or 70 years.

The advantages of this region are many, and some of them peculiar. It presents the singular fact that the mountain is fertile to the summit, (1000 feet the highest mountain, Peter's,) and much more so than the country at its base. It is more abundantly watered than any other I have ever seen. Springs of cool living water are to be found in every dell; and on my own estate, I have a copious and lasting spring near the top of the mountain, at an elevation of 600 feet at least. Its vegetation is 14 or 20 days in advance of the level conterminous country; and still it is usually exempt from the late frosts, while the fruit in the level country is destroyed by them. Mr. Jefferson told us "the frost of May 4, 1774 while destroying even the forest trees at the summit and at the foot of the mountain, left a zone of considerable breadth midway the mountain, where even the fruit escaped. The elevations on its western side present the most beautiful sites for building, furnishing, as they do to a great extent, a prospect of the Blue Ridge, distant twenty-five miles, and the intermediate country between; and above all we may fairly claim that no spot on the earth is more healthy. The soil of this region seems equally adapted to tobacco, corn and wheat. All these great staples grow finely here, and come to great perfection. The texture of the soil, in its virgin state, is a dark loam on the surface, varying from two to six inches, reposing on a clay so red as to resemble Spanish brown, and of unlimited depth, in which, as well as on the surface, ferruginous rock (inconveniently in many cases) prevails. It is entirely free from sand. It gives swift proof of the justness of the theory, that all soils have a continued inclination to return to their original condition if left to themselves. For we all know, no matter how naked and full of gulleys it may be, if uncultivated, it will in thirty years be in condition to bring even fine tobacco—an infallible test of the best land.* These, with many others that might be enumerated, are the advantages belonging to this favored region.

Its disadvantages, however, are not a few. The land is steep and stony. For although rolling land is preferred for most crops, particularly wheat, it is frequently so steep that the soil, and even part of the crop is swept off by heavy rains. Its greatest difficulty is, the growth of which it is so fruitful, the brier, the locust, the sassafras, and above all, the persimmon, which add excessively to our labor in cultivating our crops, as well as diminish the products. To war against these difficulties successfully, and to reclaim our wasted lands, the result of a barbarous system of cultivation, is an object of the first importance, and to which I wish to call the attention of the society.

The original system of tobacco and then corn, without rest till the land was exhausted, has been generally given up. It was abandoned from necessity. The first, and among the most important improvements was horizontal ploughing, introduced by the late Gov. Randolph—then a judicious routine of crops, the cultivation of clover, the free use of plaster, and the application of straw to the galls. The routine is generally corn, wheat, and clover for two years, fallowing some portion annually for wheat on a clover lay of two years' standing. The exemption of the clover as far as practicable, from the hoof; and to this end the establishment of standing pastures would be highly desirable. The cultivation of our corn crops exposes our steep lands to great danger from the heavy rains to which we are subject, and to resist which the horizontal ploughing has been found not sufficient. In the August of 1813, according to the observation of Mr. Jefferson, there fell ten inches of water in 12 hours. The effects were disastrous. So much so that it suggested to me the necessity of adopting some additional means of security, and I think I found them. I began immediately the process of hill-side ditching, which I have pursued ever since, and with great success. This process is particularly beneficial in saving our valleys. The term describes the position between two hills or mountains. Commence the ditch as high up the ravine as you wish, let it reach entirely across the valley, and in such form (that is a crescent) as that the water may be conveyed with such a descent as to keep the ditches open—which are carried on the sides of both hills, descending of course till you reach the bottom, where in the mountains we always find a stream. But I use them with great success in all steep lands, by running them about midway the descent so as to save the lower part, which without the ditch, by the accumulation and violence of the flood, would be destroyed. All the land within or below these ditches, becomes almost as valuable as the valleys, and when cured of their galls is worth $100 the acre—because they will yield on an average six per cent. annually, net profit, on an investment at that price. Still, however, much is to be done in saving our lands by judicious cultivation apart from hill-side ditching. The plan, once followed, of leaving the balk in clover between the

* It abides drought, and an excess of rain, better than any other lands we have. At the base of the mountains on the east, there is a bed of limestone, say fifty yards in width, and attending this region through its whole extent.

rows of corn, would have been effectual, but the loss of the corn crop by that plan was too serious; so that it has been abandoned. At least I, after losing two crops on my experiment of that kind, have given it up. And I have in lieu adopted the following. I flush round the hills as deep as possible, then harrow. I then lay off my rows for planting, horizontally with a two horse McCormick plough. I follow immediately the same furrow with a coulter, inserted as deep as possible, cover either with a plough or hoe, and then harrow the whole land with a four-ox harrow. This makes the soil smooth. Immediately on the corn's coming up, I run four or five times with the coulter between the corn rows—two ploughings with the shovel or bull-tongue, and a weeding with hoes, complete the crop. If from excessive rains, gulleys are produced, fill them immediately with straw or leaves, and they speedily recover. Our grand restorative, however, is the clover. Every farmer should save his own seed. It takes much better in the chaff, than clean, and the clover haulm from which the seed has been extracted, when spread on the poor spots, works a miracle in their speedy restoration. But as yet I have found no satisfactory plan, by which successfully to root out the annoying growth to which I have referred. Severe grazing will, in time, pretty effectually destroy all but the persimmon. Nothing will eat that. And for one I am ready to pronounce him a benefactor, who will discover an effectual method of destroying it. To such an one I would vote a premium of the whole funds of the society. Upon the whole, as it seems to be agreed that in the economy of Providence, something like equality was designed in his distribution—applicable not only to the various parts of the globe, but to our moral condition, let us, the inhabitants of the South West Mountains, rejoice and be grateful, that our benefits greatly preponderate over our ills. And as far as my testimony goes, resulting from actual observation of near one-third of the entire circumference of the earth, I feel no hesitation in declaring, that I deem them the most desirable abode I have ever seen.

JAMES BARBOUR.

Barboursville, Orange, Nov. 1st, 1834.

From the [British] Quarterly Journal of Agriculture.

ON THE MANAGEMENT OF LANDED PROPERTY AND SMALL FARMS IN IRELAND.

[The following details of the improvements produced by the exertions of a single judicious individual, among a population so miserable, degraded, and almost hopeless, as the poor tenantry of Ireland, must be interesting to the philanthropist and the political economist, as well as to the agriculturist possessing expanded views. Of all the reformers and benefactors of mankind, the *working* reformers are the most useful. It was because he was a working reformer, furnishing examples as well as precepts, that Oberlin was, within his humble and limited sphere of action, one of the greatest as well as one of the best of men—the one who seems to have more completely fulfilled his duty to God and man, than any of the heroes, the sages, or the saints, whose fame and virtues have been illustrated by modern history. The agent of the improvements which are described in the following extracts was a mere man of business; but one who has well proved this truth—that the same enlightened and judicious system is best to promote the several interests of the owners, and the laborers of the soil, and also of their country at large. The whole article from which these extracts are taken, is an extended review of two essays by Mr. Blacker, one of which had been honored by a prize awarded by the Royal Dublin Society. The parts omitted here relate more exclusively to the peculiar circumstances of Ireland and of the poor Irish cultivators.]

The principal causes of the inferiority of the agriculture of Ireland, are the want of *minute superintendence* on the part of the land proprietary of that country, and carelessness or want of judgement in the selection of agents.

Few country gentlemen, comparatively speaking, are either disposed or competent to undertake the trouble of introducing an improved system of farming, in defiance of old customs and long indulged prejudices, and fewer still are judicious in the choice of proper substitutes.

The agent, however honorable he may be in principle, and clever in the art of collecting rents for his employer, is too generally ignorant of rural economy; or if not so, he is too frequently without *authority* to act on his own judgement, and under the necessity of acting on a prescribed system of illiberal and defective management. While under the strictest obligation to remit to the absentee proprietor, under penalty of dismissal, a given sum on prescribed days, his representations of any circumstances connected with the actual state of the *rent-roll*, are unheeded and *unfelt*.

The absentee landlords in particular, with a few honorable exceptions, look only to the amount of remittances, and select for their agents, attorneys resident in the metropolis, merely on account of their knowledge of legal technicalities, and their ingenuity in collecting rents at a moderate per centage, without due regard to those more important talents which a land-agent should possess.

It is with reason that we complain on the part of Ireland, of the general indifference which prevails among the agents of Irish property, on the essential points of *minute management* and unremitting vigilance, regarding the condition of cottages, garden husbandry, culture of green crops, planting of orchards, &c.; all which important objects could easily be effected through the instrumentality of active overseers, subordinate to the principal agents, if their time be otherwise occupied.

It is with no ordinary degree of satisfaction, therefore, that we have read the publications of Mr. Blacker on the management of estates. These coming from an Irish agent, we estimate most highly, not so much for the details afforded of remarkable improvements effected on one or two estates, as for the *results* which we confidently anticipate these will produce. The zeal and energy of Mr. Blacker are beyond all praise, and must have a prodigious influence in stimulating to similar efforts the important and hitherto inefficient class to which he belongs.

In the preface to the second of these Essays, Mr. Blacker observes:

"For several years I had been turning my attention to the improvement of the tenantry on the estates alluded to [those of the Earl of Gosford and Colonel Close,] and had made several unsuccessful attempts to introduce a better system of agriculture, by circulating the different works published on that subject, and offering premiums for [to] those who would adopt the improvements recommended; but I had the mortification to find there were no claimants for the prizes proposed, and that every attempt I made was a complete failure. At length it occurred to me, that by writing a short address to the tenants, their attention might be drawn to the effects of the present system, and by following it up with the appointment of an agriculturist for the special purpose of instructing them; and, moreover, allow him to grant a loan* of lime to such as followed his instructions, for the purpose of replacing the manure which he might require for the cultivation of green crops, and adding my own personal influence, I might perhaps have better success."

This judicious agent, it appears, has acted perseveringly on his own principles, and after circulating manuals of agriculture suited to the circumstances of the tenantry over whom he so happily presides, to prepare the way for practical operations, he proceeded with great earnestness to promote the green crop system, among the small farmers especially, by granting premiums for house-feeding cattle, and by supplying lime, and turnip and rape seed.

In proof that an agent possessing energy of character, and a reál desire for improving land property committed to his superintendence, and backed, as in the present instance, by benevolent and judicious landlords, may effect very important results within a few years, we are informed, that, at the commencement of Mr. Blacker's labors—

"There were but two tenants on the estate of the former [Lord Gosford] and none on [that of] the latter, who were able to enter into the competition. The second year there were about fifty competitors; in the third there were not less than 300 or 400, who fed their cattle entirely, or for the most part, in the house; and this year [1834,] from the great quantity of clover seed sown last spring, I think there will be scarcely a tenant on either estate who will not feed his stock upon that plan."

Here is encouragement to the landlords of Ireland. After four years the old mode of taking successive and exhausting corn crops disappears, and a proper rotation succeeds; where weeds had previously occupied the soil clover and vetches are now seen, and turnips (and partially mangel-wurzel) have been successfully introduced.

To effect his objects, Mr. Blacker used (as already stated) a mode of inducement, which we conceive to be precisely suited to the circumstances of the small holders of Ireland—an advance of lime—thus enabling the poor farmer to raise his potato crop without the otherwise unavoidable necessity of applying to this purpose, the contents of his dunghill, which he now can devote wholly, or in part, to the culture of turnips, rape, or cabbages.

One of the great obstacles in Ireland to the raising of turnips among the small farmers, is the want, in the *first instance*, of a surplus of dung (after the necessary portion of potatoes has been planted) for the desired purpose; the difficulty lies in the *first step;* the substitution of lime meets this difficulty, and ever afterwards the green crop system works easily.

Fully satisfied, however, of the great value of dung (for the growth of potatoes) applied even in small quantities to land limed immediately before, we should prefer the application of some portion of the dunghills in all cases to the potato field. But other considerations must regulate this matter, and we are perfectly satisfied with Mr. Blacker's plan; the result of which has been so pre-eminently successful.

Our excellent agent thus urges the use of lime at the introduction of the green crop system:

"It is therefore of the utmost importance, that when you first begin to *lime*, you should raise your potatoes upon it, and make use of the house manure which this leaves at your disposal, to raise turnips or mangel-wurzel for house-feeding, and increase your stock of cattle to the utmost which this plan will enable you to keep; setting it down for certain, that you ought to have at least one cow for every three acres of arable land, as being the *smallest* stock which will enable you to keep your land in heart, when the resource of lime can no longer be looked to. If this is not kept in view from the very outset, you will find that you cannot manure the one-fourth of your farm every year, and you will therefore be thrown out of the rotation—the land will be exhausted and left to rest as formerly, and as it gets poor you will get poor yourselves; and having no longer the relief of lime to fall back upon, your case will become worse than what it is at present; for *now* by lending you lime, I have no doubt of making you comfortable and independent, if you are only industrious and willing to follow the instructions given you; but *then* this resource is lost to you, and I do not see what other can be made available to you."

Simple addresses to the agricultural classes, such as Mr. Blacker distributed, have their use. Prizes for green crops, which are the great want among the very class to which they would be most beneficial, have also their good effect; yet for one person who is able or willing to read a treatise on husbandry, there are ten disinclined to receive any information that does not come to them practically, and prizes are too often found to answer but a temporary purpose. When the stimulus of reward is withdrawn, the object for which it was proposed and granted becomes neglected; but the substantial aid of manure and seed liberally supplied to a pauper tenantry, and of *cows* to consume the newly created produce, would if afforded on an extended scale, effect much positive and permanent improvement in the condition of the humbler classes of the Irish cottagers.

And to those who may exclaim at the insupportable expense of affording such encouragement, it may be useful to present Mr. Blacker's estimate of cost:

"But what, it will be asked, may be the expense of attempting to follow a plan which, it must be ad-

* By a loan of lime, is meant an advance of a certain quantity of lime, to be paid in money, not returned in *kind*, as the expression would naturally indicate.

mitted, *seems* at least to have much to recommend it? To this it may be answered, the expense is trifling indeed, compared with the objects likely to be obtained. Those agriculturists I have hitherto brought, and who have all turned out to be very deserving men, have been engaged at a salary of 25£ a-year, with a cabin and two acres of land, rent free; or in *lieu* thereof, a lodging, with the Scotch allowance of six and a half bolls of meal, and what milk they might require, all which does not amount to more than 10£ a-year in addition to their fixed salary. Nothing can be accomplished on a large scale, without having a respectable man in this situation; for the ignorance of the generality of small farmers is such, that they will put out their lime on land not drained, whereby the advantage of it will be lost almost entirely; and they will sow the clover-seed on *exhausted* land, where it will not grow, and will therefore become a total loss; also they have, generally speaking, little idea of what *clean* land is, nor how to set about making it so, and their manure therefore goes to nourish weeds as much, or more perhaps, than the crop sown; for all which reasons, I look upon this appointment as indispensable, where any extensive success is aimed at.

"The next expense to be considered is the advance of lime. In this respect my practice has been to lend it to almost every one who applied, let their circumstances be what they might, making only the stipulation that the instructions given should be strictly followed. I adopted this line in order to show the people that my wish was to benefit every one, and that I was not actuated by the selfish motive of merely aiding the very poor class, in order to lessen my own trouble in getting in the rents. The liberality of my employers enabled me to act on this extended plan, which of course occasioned the greater outlay. But when the landlord is restricted in means, of course the loan will be confined to those who stand most in need of assistance. The advance required depends so much upon the size of the farms, the density of the population, and other circumstances, that it is hard to fix upon any sum per thousand acres, as sufficient for this branch of the expenditure. The more people there are, the more industry is capable of being brought into activity, and the more capital is of course required; likewise the greater the poverty the greater assistance will be necessary; so that the advance required must evidently vary in different estates, though they may consist of the same number of acres.

"But I would hazard the opinon, that in most parts of the north of Ireland, 50£ per thousand acres would be found sufficient to supply the requisite loan of lime, and provide turnip and rape seed, which I have as yet given gratis. Every poor tenantry will be found so much in debt for their seed-oats, seed-potatoes, and perhaps even for subsistence, and subjected thereby to such usurious charges, that I have found it necessary to give in the first instance three years' credit, in order to get them out of the power of their creditors. The repayment of the sum so lent now forms a fund for carrying on the system, and I do not anticipate being obliged to make further demands upon my employers; but when this credit, from the pecuniary wants of the landlords, cannot be given, I think the repayment might be insisted upon from the produce of the first grain crop after the loan. My lending of clover-seed was an afterthought, but is a matter of pecuniary importance, and the cost of so large a supply came to such a sum, that I was obliged to limit the credit upon it to six months, which brought the repayment to the time of harvest, and as I obtained the same credit from the London seedsman that I gave to the tenantry, there was no advance of money in that particular, and the advantage has been the greatest that could be imagined, in doing away immediately with the practice of sowing successive grain-crops as already alluded to.

"To sum up the whole then, it would appear, that to make the conviction produced by the perusal of the pamphlet *operative*, all that would be necessary on the part of the *landlord*, would be, an annual outlay of about 35£ to the agriculturist which would afford the necessary instruction and an advance of about 50£ a-year per 1000 acres, for three years at most, in lime, to replace the manure taken from the potato crop. This is the entire expense, except the trifling cost of the pamphlets; and when to this the tenant has added his industry, and the agent his influence, the system is complete. I do not in the above calculation, include the trifling sum which the landlord may feel disposed to give the premiums for the encouragement of those who most distinguished themselves by their exertions, nor any occasional assistance he may feel disposed to give in lending a pound or two for a few months to assist a tenant in buying an additional cow, when his clover was superabundant; these being optional matters, and not absolutely necessary."

The usurious prices paid in many places by poor farmers for seed-oats and potatoes, are often most oppressive. Twenty-five per cent. has been frequently paid for the accommodation of seed-oats in spring (of inferior quality too,) to be paid for in the ensuing autumn. By supplying seed, therefore, on *fair terms*, an agent may frequently save a poor tenant from considerable loss, and as to clover and grass-seeds (the latter usually of the worst and most dirty description on the small farmer's field,) these may be supplied by obtaining credit from the seedsman, as Mr. Blacker did, without the actual loss of a single shilling.

It appears from the pamphlets before us, that the tenants thus aided, from having strong motives to exertion, are extremely industrious; theirs is not the hopeless condition of men deep in arrear and without a ray of hope, in apprehension of ejection from their homes, and destitution in consequence, but the happy state of a peasantry full of hope and energy, and enjoying independence, or at least every rational anticipation of it.

On the Cavan estate of Lord Gosford, consisting of 8000 acres, and moderately set, the arrears *had* been increasing; yet in the second year of Mr. Blacker's operations, the rents of the then current year were discharged, with a *part* of the arrears, and many of the tenants have subsequently paid up all which they owed, Mr. Blacker having made a rule "*never to forgive any arrears whatever*," (unless a retrospective reduction in the amount of rent, calculated with reference to agricultural prices and proportionally granted to all the tenants, be so considered,) which would be a discouragement to those who had regularly paid their rents.

* * * * * * *

The general maxims (each of them enforced by argument and illustration which Mr. Blacker lays down for observance, are in strict accordance with the most generally received principles of husbandry. We shall insert the heads of them, for although they teach nothing particularly new, they are succinctly and judiciously arranged, and ought to be pressed upon the attention of *every* farmer.

1. The ground must be thoroughly drained.
2. Weeds must be destroyed.
3. All cattle must be fed in the house or straw-yard upon good food.
4. Two successive crops of the same kind not to be taken.

Under this head are the following observations:—

"I am fully sensible, however, that a system of over-cropping with grain will extract *every kind* of nourishment from the soil, and leave it so *that it will not even yield grass.* This is the case with land which is left to *rest*, as it is called, by those who take three or four grain crops in succession, and the phrase is well applied, for the land is really not fit to *do any thing.* The error of this class of persons is, that they turn the land to grass at the *end* in place of the *beginning* of their course. Had *grass-seed* been sown with the *first crop of grain*, there would have been a good crop of hay, and good after-grass, and the second crop of grain would have been as good as the first; and this is what ought to have been done by those whose land is not suited to clover, or who from poverty are not able to buy clover seed; and even where *two* grain crops have been taken, it would be better to sow it with rye-grass, which will yield a crop on very poor land, rather than to leave the ground to be possessed by weeds and such herbage as may naturally rise. The fact is, the last exhausting crop should only be put in upon that portion of the farm which is intended for potatoes, and other green crops, the *succeeding year*, which crops then give the manure to restore it to a productive state; and by this means there is no land at all lost by what is called *resting* it."

5. The place for manure should be so contrived as not to be exposed to any accumulation of rain water; but should receive the contributions from the sewers of the house, stable, cow-house, &c.
6. Advantage of straight fences.
7. Levelling of unnecessary ones.
8. The absurdity of keeping horses on small farms, and the superiority of spade husbandry.
9. Formation of ridges.
10. Impropriety of selling straw off the farm.

* * * * *

We are sometimes gravely told that there is no use in sowing turnips in many parts of Ireland, where they would be assuredly stolen. As Mr. Blacker does not touch upon this objection, we are bound to suppose (giving him due credit for strict honor and impartially in the advocacy of the above case,) that the people around him are not disposed to pilfer turnips to any sensible degree; and indeed, we happen to know perfectly well that a crop of turnips is as safe from spoliation as a crop of beans; but that if either of these be a solitary and unusual crop in a neighborhood teeming with children, a desire to taste it may lead to the abstraction of an inconsiderable portion of them, but the novelty soon wears off, and the eating of raw turnips or beans brings with it the sure penalty of indigestion and all its painful concomitants, which effectually prevents a recurrence of the practice.

This matter reminds us of a story somewhere told of a farmer in the northern part of Scotland, some forty years ago, when turnip culture was beginning to creep into the country:—He sowed a head ridge *for the use of the public*; and put up a label with this inscription, "*You are requested to steal out of this spot.*" This hint may be serviceable.

For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

Money has recently become very abundant in the large cities, and the consequence is that stocks of almost every description have advanced in price. Exchange on England has risen to 8½ to 9 per cent. premium. The cause of this influx of money is not very apparent here, but could no doubt be explained by the capitalists in the large cities, where investments to an unprecedented extent are made in real estate, and in rail road and other stocks of a similar character.

Speculation will, as usual, probably be carried too far, and when a reaction takes place, it will be ruinous to many.

Agricultural products generally bear high prices, with the exception of grain and flour, which requires a greater foreign demand than has existed for two years past to take off the surplus, created chiefly in the northern and western states. Flour commands $4⅝ to 4¾ except that of the city mills, large shipments of which are seeking a market in South America.

The price of tobacco is fully supported—the most inferior at $4.25 and ranging as in quality up to $9. The finer sorts do not yet begin to appear, and will not to any extent until June and July.

Cotton has again advanced, and is now higher than at any period during the last twelve months. Crops embracing good and common qualities sell at 16 cents, and selections at 16¼ to 16½ cents. The quantity brought to market in Virginia will be one-third less than in the last season, and may be estimated at about 28,000 bales, allowing 4000 bales yet to arrive. The estimate of the crop of the United States which at one time was as high as 1,300,000 bales, is now reduced to 1,200,000, and it is believed that this quantity will not be more than sufficient to meet the demand.

X.

March 25th, 1835.

For the Farmers' Register.

ON THE PAMUNKY MODE OF MAKING CORN.

However "strange it may appear" to W. B. H. [No. 8 Farmers' Register, p. 466.] "that any one should think the Pamunky mode of making corn the cheapest, or most labor saving," there are some people who still adhere to that opinion. The two or three weedings with the hoe in the Pamunky way, are not more than equal to one in the common way of working corn, and the plough is the chief implement in its cultivation.

But if W. B. H. has been able to dispense entirely with the hoe, and substitute the plough al-

together in making corn, then indeed I must give up "that nothing but the agency of steam" can compete with him.

PAMUNKY.

THE SEASON AND WEATHER.

Since the commencement of the year, there has been an unusually large proportion of rain and snow, and still more of severe cold weather: and the season, to the 24th of March, has been not more remarkable for our latitude, than it has been unfavorable to the farmer's operations and prospects. Besides that the almost continued wetness of the earth caused it generally to be unfit for ploughing, even when not frozen, there have been four spells of cold, each of which, if alone, might have been considered remarkably severe. The first and longest of these was early in January. Of this we have as yet no accurate report of observations by the thermometer—but believe that the cold was not as severe in Lower Virginia, for its latitude and elevation, as elsewhere. At Washington City, the lowest temperature was 16 degrees below 0, and at several places in the state of New York and New England, it was 40 degrees below 0. The weather here on February the 8th, was supposed by many to be the coldest ever felt—and it certainly appeared so, owing to the sudden change from a mild preceding day, and the violence of the cold wind. But in fact the thermometer (at Shellbanks) was but a little below 0, and was still lower the next morning, when it stood at 2 degrees below 0. On March the 1st, the mercury was as low as 5 degrees below 0—and after some warm weather, another change to cold took place on the 23rd, and on the 24th the thermometer was at 28 degrees. On that day, the weather again became more suitable to the time of year.

In consequence of this state of the weather, the ploughing for corn has been unusually late—and it may be inferred, that much of it has been imperfectly or improperly done, owing to the general wet state of the earth. The wheat has suffered severely, and much of it is killed. The clover sowing of those farmers who harrow wheat land for that purpose, has also been very late—but the plants will probably not, therefore, fare worse than those from seed sown early—as the sprouting of these was either retarded as long by the cold—or if sprouted, may have been killed. More or less injury will be inevitable every where, from the past season to all these crops—varying in extent, according to the nature of the soils, und their greater or less liability to suffer from wet and cold.

Vegetation has been so long kept dormant, that it might have been supposed there was now but little danger of the most early or tender blossoms being destroyed by future frosts; and, therefore, that a plentiful fruit year might be anticipated. But if the following statement may be relied on, it seems that the severity of cold has destroyed, instead of serving to protect the germs of early fruit.

The lovers of good fruit will be very sorry to learn, that the prospect of a peach crop this year, has been utterly blasted by the extraordinary severity of the past winter. Upon examination, the vitality of the bud, we are informed, is destroyed, and there will consequently be no bloom. The same is the case probably with the apricot, and others of the least hardy kind. We understand, also, that considerable injury was done to the wheat by the intense frosts of February, when it was unprotected by any covering of snow. Our climate surely is not ameliorating, as has been generally supposed.—*Fredericksburg Herald,*

"FLORIDA COFFEE"—OKRA.

To the Editor of the Farmers' Register.

Your February number contains another example of the uncertainty of the common names of plants. A gentleman in East Florida speaks of his cultivating a plant which he calls *Florida coffee.* He says it is an annual plant, &c. Now, it must be evident, this is *not* a species of *coffee*, but some other plant, of a very different nature. The coffee plant is a *shrub* which bears its fruit in the form of a *berry*, and the *grains* used in commerce are obtained from the berries. The plant spoken of above, appears to bear its fruit in the form of a pod or legume. It would be desirable, therefore, to know something more of this plant than we can know by the name thus given it. * * * *

February 23.

To resume a subject which I mentioned in my last, I now suspect that the plant which the gentleman in East Florida calls "Florida coffee" is the *okra-plant (Hibiscus esculentus,)* frequently cultivated in the gardens of the southern states, and which (as Mr. Nutall says) will ripen its seeds as far north as Pennsylvania. The *unripe* capsules (or seed vessels) of this plant, when boiled, afford a delicious article of diet. It is also a good ingredient in most of our *soups*, and constitutes (I believe) a principal one in the famous *gumbo* of the creole French and Spanish of Louisiana and Florida. I have heard that the ripe seeds make one of the best *substitutes* for *coffee*, but the plant itself is much more nearly related to cotton than to coffee. Its flower, which is beautiful, very much resembles that of the sea island cotton. It is a native of the eastern continent, and if it grows wild in any part of America, it must have been naturalized. I have seen it, in Middle Florida, spring spontaneously from the seeds of the preceding year.

H. B. CROOM.

From the Farmer and Gardener.

INCREASED PRICE OF LAND CAUSED BY MARL.

A farm near Monmouth in New Jersey, which was purchased a few years ago for about two dollars an acre, recently sold for thirty. This extraordinary increase of value has been produced by the effect of marl upon the soil. From this, many of our fellow-citizens in the country can infer what treasures they possess, either on their own lands, or within reach of them. Land owners throughout Maryland, are greatly indebted to the legislature for providing for a full geological examination of every county in it.

THEFTS COMMITTED ON THE MAILS.

The editor of the Southern Religious Telegraph has recently published a list of letters directed to him, containing money, which had been stolen in passing through the mails. We could state as many losses of

the same kind, and will henceforth adopt that plan in the receipt lists, in hopes that it may possibly lead to the detection of the thieves. One has recently been discovered (an assistant) in the post office at Cumberland Court House. But he is not the only one who has lately been engaged in such business, as letters containing money have been lost through other routes.

We are content to incur the risk of these and other losses by mail—but hereafter subscribers remitting money *must* comply with the published conditions upon which that risk was assumed, viz: *that evidence be furnished by a postmaster's certificate, or otherwise, of the committing the letter and money to the mail.* As reasonable and necessary as this requisition manifestly is, it has seldom been complied with—and we have, (notwithstanding the omission) given credit for every alleged transmission that failed to arrive, upon the simple and general statement of the subscriber. But though not doubting any of these statements, it is evident that such procedure subjects us to the danger of imposition and also *prevents the possibility of establishing the fact of the theft*, and tracing it to the offender. We therefore shall hereafter admit no payment of money lost or stolen, without the proper evidence and date of the mailing—and it will also be more safe, and serve better the ends of justice, if each remitter of subscriptions by mail will keep a memorandum not only of the date of his letter, but also of the description of the notes enclosed. For want of this means for identifying some of our money which has probably been found in the possession of this public officer in Cumberland, it will go as part of the fee to his lawyers for defending him, instead of to its owner.

It is also requested of subscribers who transmit money by mail to enclose it more carefully, as it is frequently done in such a manner as to expose the notes contained to both the eyes and fingers of any who may handle the letters, and thus unnecessarily to tempt to thefts.

There is one means, which if used, would prevent nearly all these thefts which are now so often committed in post offices. In every case of the kind, the postmaster who employed the thief, (however respectable or honorable the employer may be,) should be displaced—and also be made liable for the money proved to be stolen by his assistant. This would render postmasters as careful of the characters of their assistants, as merchants are of their's. As it is, assistants are trusted with the mails who would not be trusted by their employers with their own "untold money"—and even the postmasters themselves, of very many small offices, are men of small pretensions to character or responsibility. This state of things is a great evil, which surely needs correction, both from the government, and from from every individual citizen who knows any of the existing abuses.

THE RECENT ENACTMENTS OF THE LEGISLATURE OF VIRGINIA, AFFECTING THE INTERESTS OF AGRICULTURE.

The General Assembly which adjourned the last month has done *something* for the promotion of agricultural interests—not much it is true—but let us be thankful for even small favors, as they exhibit a marked departure from the previous regardless and denying course of our state government (the only government to which we look for aid, or acknowledge as having the right to act—) in every thing relating to this great interest of Virginia. These acts, therefore, deserve especial notice, not only for their actual worth, but as indications of greater benefits and more enlightened and equitable treatment, to be expected hereafter.

Three several acts have been passed in conformity with petitions presented, declaring certain navigable rivers and creeks to be lawful enclosures. One is for Willis' River, another for the Upper James River, and the third conforms fully to the petition published in this work at page 450, Vol. II. which asked that the navigable tide-waters of James River and its tributaries should be deemed lawful enclosures. This act will be published hereafter. Another most important boon to the landed interests, and to science, has been granted in the act authorizing the commencement of a geological survey of Virginia, which, with the report on which it is founded, have been inserted in this No. The full and interesting statements of that report leave nothing to be said of the advantages to agriculture and to the commonwealth, that may be expected from the fulfilment of its object. We will dismiss the subject, with merely congratulating our readers on the adoption of a measure which has been strongly urged in this journal from its commencement—and with the expression of the hope that the execution of the work may be committed to one who is worthy of the charge.

The three acts making certain rivers lawful enclosures, are highly important in themselves, as affording extensive relief from the operation of our abominable general law of enclosures—and still more so, as steps, advancing slowly but surely, to the general adoption of the same system of justice and good policy. Zealous as we are, and long have been, for the overthrow of the present law of enclosures, we are free to admit that this mode of reaching that end, in connexion with enlightening the public mind on the subject, is better than a sudden and entire change of policy, before the proper change of opinion, and removal of prejudice, are produced. With these views, we cannot object (at this time) to the conclusion to which the Committee of Agriculture and Manufactures arrived, (and which was sustained by the legislature,) in recommending the rejection of the petition for a change of the general law of enclosures. But at the same time, we must protest against the miserable and false reasoning by which they reached that conclusion, and which is worthy only of court-yard and grog-pen demagogues, addressing themselves to the ignorance of those whom they flatter, despise, and betray. This report will be presented below entire. A "committee of agriculture" that deserved to be so named, would be of the most important use—and the members who composed it would have an opportunity of rendering the most distinguished services to agriculture, and their country. But if this committee, in the six or eight years of its existence, has ever done its country or agriculture the least good, or has drawn to its members the least honor, we have yet to learn the facts.

REPORT OF THE COMMITTEE OF AGRICULTURE AND MANUFACTURES ON THE PETITIONS FOR A CHANGE OF THE GENERAL LAW OF ENCLOSURES.

The Committee of Agriculture and Manufactures, to whom were referred sundry petitions from the counties of Cumberland, Goochland, Prince George, Caroline, Essex, Nansemond, Stafford and Spottsylvania, praying an alteration in the law relating to enclosures, after having attentively considered the same, are induced to believe that the circumstances and condition of various parts of the state are so different, that no change could be made in the general law, which would not operate unequally, and injuriously to some; that in the west, there are many large bodies of waste and unappropriated land, which afford valuable pasturage to the inhabitants of the adjacent country, who would be deprived of this advantage were they compelled to confine their stock within their own pastures; that in the eastern and more cultivated parts of the state, many poor persons have derived advantage from grazing their small stock on the commons and unenclosed lands, and to whom the obligation to confine them, or a liability to damages if not confined, would operate as a great hardship. There are, no doubt, neighborhoods, in regard to which, it might be desirable to change the present laws; but such circumstances seem to your committee too much circumscribed to justify a local legislation extending to the limits of an entire county:

Resolved therefore, as the opinion of this committee, That the aforesaid petitions be rejected.

For the Farmers' Register.

MARL IN CHARLOTTE COUNTY, VA.

The following is a brief description of a very singular argillaceous limestone, as it appears to be, which I lately discovered thrown out of a ditch at the margin of the low grounds, in attempting to convey water to a meadow.

The stones (which appear to have very little grit or sand in them,) have, the most of them, the appearance of races of ginger, or like lead poured out on the earth, by which it is made rough and full of holes; or rather the surface of these stones have the appearance of a petrified wasp's nest (like what is called the honeycomb rock.) They are of various sizes, (some of which are round) from the size of a hen's egg or a walnut, to a pea. More than half of the earth or clay thrown out in which they are imbedded, and with which they have no communication, appears to be composed of these stones. They have the appearance of *old* plastering, thrown out on the ground where they lie, the color of lime mortar when wet, but a great deal whiter when dry. With a knife they cut very much like slate, and the cut is of a very whitish appearance—more so than the other part of the stone. The atmosphere has little effect upon them, where they are on the bank, only to bleach them, when they have the appearance of bones scattered on the ground. The indications are a large round ferruginous rock, found at the bottom of the ditch, with many smaller ones on the surface. A very rich blue clay is found under this bed of calcareous stones, which effervesces with acid. The earth also effervesces in which the stones are imbedded.

As to the properties of the above mentioned substance, it appears to possess all those of lime. It effervesces violently with vinegar and nitric acid. Before it is burnt, it is insipid, inodorous and permanent—when calcined to a red heat, it becomes as white as lime—becomes lighter—and when pounded and mixed with water, it makes as strong lime water as lime itself. When thrown into the water after calcination, it produces a hissing noise and heat, as lime does. After calcination it is rather of a greenish white, and is of a strong pungent taste and odor. If properly calcined, I have no doubt it would make very good lime. As yet I have made very little experiment in the way of digging, and none in the application of these stones or the clay, on the bed of sand. The stone is very easily ground as fine as flour, from which any one could scarcely discover the difference, either in the appearance (for it is very white when ground) or in the feeling.

N. E. READ.

ON EDITORIAL COMMENTS.

We have understood that an erroneous construction has been placed on the circumstance of editorial remarks being attached to communications, or not—and that, independent of what the words may convey, the mere accompaniment of any editorial remark is considered as a compliment to the writer, which of course is withheld from others on whom no comments are made. We should not think this most mistaken opinion worth correcting, but for fear of its possibly extending to some persons who may consider themselves overlooked in a distribution compliments, which we had no idea of presuming to offer. We desire that our remarks may be construed according to their expressions only. So far from being called forth merely to express approbation, they have been more generally produced by some inquiry, or some difference of opinion, or some objection to the writer's views: sometimes to ask attention to what was novel and contrary to general opinion, and sometimes to carry out the argument, left incomplete, or to introduce other views suggested by what had been stated. In short, upon any ground calling for remarks, they have been made—but very rarely if ever, to convey, either directly or indirectly, mere approbation of a valuable communication. On the contrary, it has happened upon many occasions, that some of those which we would rank among the most valuable in this work, have been inserted without a word of comment, because none was needed. The foregoing pages of this number, present several illustrations of our thus acting on the ground of the old adage, that "good wine needs no bush"—and every attentive reader can easily call to mind many similar and earlier examples: and every judicious reader will concur in our opinion, that it would be as improper, as it would be presuming, for us to make known our comparative estimate of the value of communications—and as improper in others, to make for our use an imaginary and false standard, which we protest against using, or that any should pay respect to. Of all, therefore, who have fallen into this mistake, we request that every trace of such impressions may be dismissed from their minds.